

**State of California
AIR RESOURCES BOARD**

**Executive Order VR-102-A
OPW Phase I Vapor Recovery System**

WHEREAS, the California Air Resources Board (CARB) has established, pursuant to California Health and Safety Code sections 39600, 39601 and 41954, certification procedures for systems designed for the control of gasoline vapor emissions during the filling of underground gasoline storage tanks, in its **CP-201 Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities (Certification Procedure)** as last amended July 25, 2001 incorporated by reference in Title 17, California Code of Regulations, Section 94011;

WHEREAS, CARB has established, pursuant to California Health and Safety Code sections 39600, 39601 and 41954, test procedures for determining the compliance of Phase I vapor recovery systems with emission standards;

WHEREAS, OPW Fueling Components, Inc. (OPW) has applied for certification of the Phase I Vapor Recovery System (OPW System);

WHEREAS, the Certification Procedure provides that the CARB Executive Officer shall issue an order of certification if he or she determines that the vapor recovery system conforms to all of the applicable requirements set forth in the Certification Procedure; and

WHEREAS, I, Michael P. Kenny, California Air Resources Board Executive Officer, find that the OPW Phase I Vapor Recovery System conforms with all of the requirements set forth in the Certification Procedure, and results in a vapor recovery system which is at least 98.0 percent efficient as tested pursuant to the test procedure for **TP-201.1 Volumetric Efficiency of Phase I Systems**;

NOW THEREFORE, IT IS HEREBY ORDERED that the OPW System is certified to be at least 98.0 percent efficient. Exhibit 1 contains a list of the certified components by manufacturer and model number. Exhibit 2 contains the performance standards and specifications, maintenance intervals and the certified installation and maintenance instructions for the OPW System. Exhibit 3 contains the manufacturing specifications. Exhibit 4 is the test procedure **Static Torque of Rotatable Phase I Adaptors**. Exhibit 5 is the test procedure **Leak Rate of Drop Tube Overfill Prevention Device**. Exhibit 6 is the test procedure **Leak Rate of Pressure/Vacuum Vent Valves**.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements, rules and regulations of the Division of Measurement Standards of the Department of Food and Agriculture, the Office of the State Fire Marshal of the Department of Forestry and Fire Protection, and the Division of Occupational Safety and Health of the Department of Industrial Relations is made a condition of this certification.

IT IS FURTHER ORDERED that the certified OPW system and components contained herein shall be warranted, in writing, for at least one year from the date of installation, to the ultimate purchaser and each subsequent purchaser within the warranty period. The warranty shall specify that the vapor recovery system is designed, built and equipped so as to conform at the time of original sale and installation with the applicable performance standards and performance specifications and is free from defects in materials and workmanship which could cause the vapor recovery system to fail. Copies of the manufacturer's warranty for the system and components shall be made available to the gasoline dispensing facility (GDF) owner/operator and a warranty tag shall be affixed as required in the Certification Procedure.

IT IS FURTHER ORDERED that the system, as installed, shall comply with the procedures, performance standards and performance specifications which the test installation was required to meet during certification testing. If, in the judgment of the Executive Officer, a significant fraction of installations fail to meet the requirements of this certification, the certification may be subject to modification or revocation.

IT IS FURTHER ORDERED that each Pressure/Vacuum Vent Valve (P/V Valve), Spill Container Drain Valve and Rotatable Adaptor shall be 100 percent performance tested at the factory, and shall comply with the requirements specified in Exhibit 3.

IT IS FURTHER ORDERED that each OPW System component listed in Exhibit 1, Figure 1A, shall be clearly labeled by a permanent identification showing the manufacturer's name and model number.

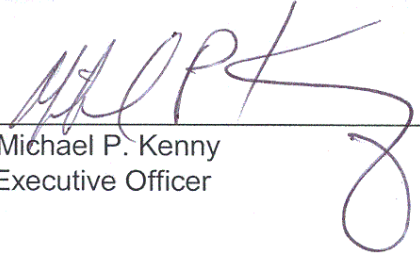
IT IS FURTHER ORDERED that the certified OPW system shall be installed and maintained in accordance with the manufacturer's recommended installation and maintenance instructions contained in this Executive Order. A copy of this Executive Order shall be available at each GDF where the certified OPW system is installed.

IT IS FURTHER ORDERED that any alteration in the equipment parts, design, installation or operation of the system certified hereby is prohibited and deemed inconsistent with this certification unless the alteration has been submitted in writing and approved in writing by the Executive Officer or by the Executive Officer's delegate.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification. The owner or operator of the OPW System shall conduct, and pass, the following tests no later than 60 days after startup and at least once every 3 years after startup testing; shorter time periods may be specified in accordance with local district rules and regulations. **TP-201.3 Determination of 2 Inch H₂O Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities; Exhibit 4, Static Torque of Rotatable Phase I Adaptors; Exhibit 5 Leak Rate of Drop Tube Overfill Prevention Device; and Exhibit 6, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves.** Notification of testing, and submittal of test results, shall be done in accordance with local district rules and pursuant to the policies established by that district. Alternative test procedures may be used if determined by the Executive Officer, in writing, to yield comparable results.

IT IS FURTHER ORDERED that the certification of the OPW Phase I vapor recovery system is valid through September 30, 2006.

Executed at Sacramento, California, this 10th day of October 2002.



Michael P. Kenny
Executive Officer

Attachments:

- Exhibit 1 OPW Phase I Vapor Recovery System Equipment List
- Exhibit 2 Installation, Maintenance and Compliance Specifications
- Exhibit 3 Manufacturers Performance Standards and Specifications
- Exhibit 4 Static Torque of Rotatable Phase I Adaptors
- Exhibit 5 Leak Rate of Drop Tube Overfill Prevention Device
- Exhibit 6 Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves

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Exhibit 1

Figure 1A

OPW Phase I Vapor Recovery System Equipment List

Component Name		Manufacturer	Model Number
Spill Containers and Covers ¹	Figure 2E	OPW/POMECO	1-2100 Series 1C-2100 Series 1SC-2100 Series
Replacement Drain Valve Kit	Figure 2F	OPW	1DK-2100
Gasket Seal Adaptor	Figure 2G	OPW	FSA-400
Rotatable Phase I Adaptors	Figure 2H Figure 2I	OPW	61SALP-EVR (product) 61VSA-EVR (vapor)
Installation Tool	Figure 2J	OPW	61SA-Tool
Dust Caps	Figure 2K	OPW	634TT-EVR (product) 1711T-EVR (vapor)
Drop Tube Overfill Prevention Device ²	Figure 2L	OPW	61SO-EVR Series
Jack Screw Kit	Figure 2M	OPW	61JSK-4400-EVR
Tank Bottom Protector	Figure 2N	OPW	6111-1400 (optional)
Tank Gauge Port Components	Figure 2O	Morrison Brothers	305XPA Series Tank Monitoring Cap and Ring Kit
Pressure/Vacuum Vent Valve	Figure 2P	Husky	Model 4885, 2-Inch Threaded

¹ The OPW/Pomeco 511 series covers include the 1-2100, 1C-2100 or 1SC-2100 spill containers.

² Ball float vent valves are not certified for installation of this system in new facilities (including those undergoing major modifications).

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Exhibit 2

Installation, Maintenance and Compliance Specifications

This exhibit contains the specifications used for the proper installation and maintenance of the system by which compliance of the Gasoline Dispensing Facility (GDF) is to be determined.

General Specifications

1. The OPW System shall be installed and maintained according to the manufacturer's specifications and demonstrate compliance with the Certification and Test Procedures **TP-201.3 Determination of 2 Inch H₂O Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities; Exhibit 4, Static Torque of Rotatable Phase I Adaptors; Exhibit 5, Pressure Integrity of Drop Tube/Drain Valve Assembly; and Exhibit 6, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves.** Testing shall be successfully conducted within 60 days of installation and at least once every three years thereafter; shorter time periods may be specified in accordance with local district rules and regulations.
2. During all Phase I deliveries there shall be at least one vapor recovery connection, between the cargo tank and the GDF storage tank into which fuel is being delivered, to ensure that vapor is returned to the cargo tank from the underground storage tank system.

Pressure/Vacuum Vent Valves For Storage Tank Vent Pipes

1. Vent pipes may be manifolded to produce a single vent outlet on which a single Pressure/Vacuum (P/V) Vent Valve is installed.
2. A maximum number of Pressure/Vacuum Vent Valves, not exceeding an additive leakrate of 0.17 CFH at 2.00 inches H₂O, shall be used on any single GDF.
3. Vent pipe manifolds shall be constructed of steel pipe or an equivalent material that has been listed for use with gasoline. If a material other than steel is used the GDF operator shall make available information demonstrating that the material is compatible for use with gasoline. An example of a vent pipe manifold is shown in Figure 2Q. This example reflects only one allowable configuration. For example, a tee may be located either at the left, center or right side, and more or fewer vent pipes may be manifold together.
4. The vent pipe manifold shall be installed at a height not less than 12 feet above the grade used for gasoline cargo tank delivery operations and shall conform to all applicable fire regulations.
5. Each P/V Valve shall have permanently affixed to it a yellow or gold label with black lettering stating the following specifications:

Positive pressure setting: 3.0 ± 0.5 inches H₂O
Negative pressure setting: 8.0 ± 2.0 inches H₂O
Positive Leakrate: 0.05 CFH at 2.0 inches H₂O.
Negative Leakrate: 0.21 CFH at -4.0 inches H₂O

Rotatable Product and Vapor Recovery Adaptors

1. Rotatable product and vapor recovery adaptors shall maintain a minimum 360-degree rotation and average static torque not to exceed 108 pound-inch (9 pound-foot) when tested as specified in Exhibit 4.
2. The vapor adaptor poppet shall not leak when closed. The absence of vapor leaks may be verified with the use of commercial liquid leak detection solution, or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists).

Vapor Recovery and Product Adaptor Dust Caps

1. Dust caps shall be installed on all Phase I tank adaptors.

Drain Valve and Configuration

1. The Drain Valve and its configuration are designed to drain liquid directly into the drop tube and are therefore isolated from the underground storage tank ullage. When isolated and tested in accordance with Exhibit 5, the Drop Tube/Drain Valve Assembly shall not exceed 0.17 CFH at 2.00 inches H₂O.

Drop Tube Overfill Prevention Device

1. The Drop Tube Overfill Prevention Device (Overfill Device) is designed to restrict the flow of gasoline delivered to the underground storage at liquid levels greater than 95 percent of the total tank capacity. Seals on the device may allow vapor to escape to atmosphere during normal operation. When tested in accordance with Exhibit 5, the leak rate shall not exceed 0.17 CFH at 2.00 inches H₂O.
2. The contractor or installing agency of the Overfill Device shall make available to the district the following measurements required for the installation of the device:
 - a. Tank Diameter (inches)
 - b. 95 percent tank level (inches, measured from tank bottom)
 - c. Installed location of the Overfill Device actuation mark (inches, from the tank bottom).
 - d. Tank capacity (in percent) where the Overfill Device actuation mark is installed.
Note: In some instances, this figure may be less than 95 percent total tank capacity due to design requirements of the device. In this instance, the electronic tank level system may not reflect the location of the Overfill Device actuation mark.
3. No type of device shall be used at any time to reach into an installed drop tube and manually open, close or modify a Drop Tube Overfill Prevention Device.
4. Product deliveries, in which a storage tank is filled above the 95 percent liquid level and/or engages the Overfill Device shall be concluded immediately. At no time shall product deliveries be allowed to exceed the total tank capacity or discharge liquid into the underground piping system. Liquid levels in the tank shall be allowed to subside below the storage tank 95 percent level prior to delivering additional product.

5. In the case of a defect where an Overfill Device becomes lodged in the closed position after the storage tank liquid level has been allowed to subside, the device shall be removed from the storage tank for inspection and/or replacement.

Vapor Recovery Riser Offset

1. The vapor recovery tank riser may be offset from the tank connection to the vapor recovery Spill Container provided that the maximum horizontal distance (offset distance) does not exceed twenty (20) inches.
2. The vapor recovery riser may be offset up to the maximum allowable horizontal distance with use of commercially available, four (4) inch diameter steel pipe fittings.

Gasket Seal Adaptor

1. A Gasket Seal Adaptor, used to produce a machined flat surface for a gasket seal shall be installed on the following required connections. As an option, an owner/operator may install the adaptor on other connections to ensure a flat surface exists.
 - a. Product Spill Container (required)
 - b. Tank Gauging Components (required)
 - c. Vapor Recovery Spill Container (optional)
 - d. Rotatable Adaptors (optional)
2. The Gasket Seal Adaptor shall provide a machined surface on which a gasket can seal by controlling jagged or rough cut riser pipe threads.

Figure 2A

Facility Compliance Specifications

Component	Test Method	Standard or Specification
Rotatable Phase I Adaptors	Exhibit 4	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Overfill Prevention Device	Exhibit 5	≤ 0.17 CFH at 2.00 inches H ₂ O
Drain Valve Assembly	Exhibit 5	≤ 0.17 CFH at 2.00 inches H ₂ O
UST, P/V Valve, Fittings, Adaptors, and Connections	TP-201.3	2.00 inches H ₂ O – 5 minutes
Pressure/Vacuum Vent Valve	Exhibit 6	Positive Pressure: 3.0 ± 0.5 inches H ₂ O Negative Pressure: 8.0 ± 2.0 inches H ₂ O Leakrate: ≤ 0.05 CFH at +2.0 inches H ₂ O ≤ 0.21 CFH at -4.0 inches H ₂ O

Figure 2B

OPW Recommended Maintenance Intervals for System Components

Component	Maintenance Interval
Spill Container And Drain Valve	Annually, See Figure 2E and Figure 2F.
Rotatable Phase I Adaptors	Annually, See Figure 2H and 2I.
Dust Caps	Annually, See Figure 2K.
Overfill Prevention Device	Annually, See Figure 2L.
Pressure/Vacuum Vent Valve	Annually, See Figure 2P.

Each GDF operator/owner shall keep a maintenance log at the facility. The maintenance log shall identify, in chronological order, the date, maintenance performed, maintenance company name, telephone and name of individual(s) conducting maintenance. An example of a Phase I Maintenance Log is shown in Figure 2R. Alternate forms may be used provided they contain the same minimum parameters identified in Figure 2R.

Figure 2C

Typical Product Side Installation Using OPW System

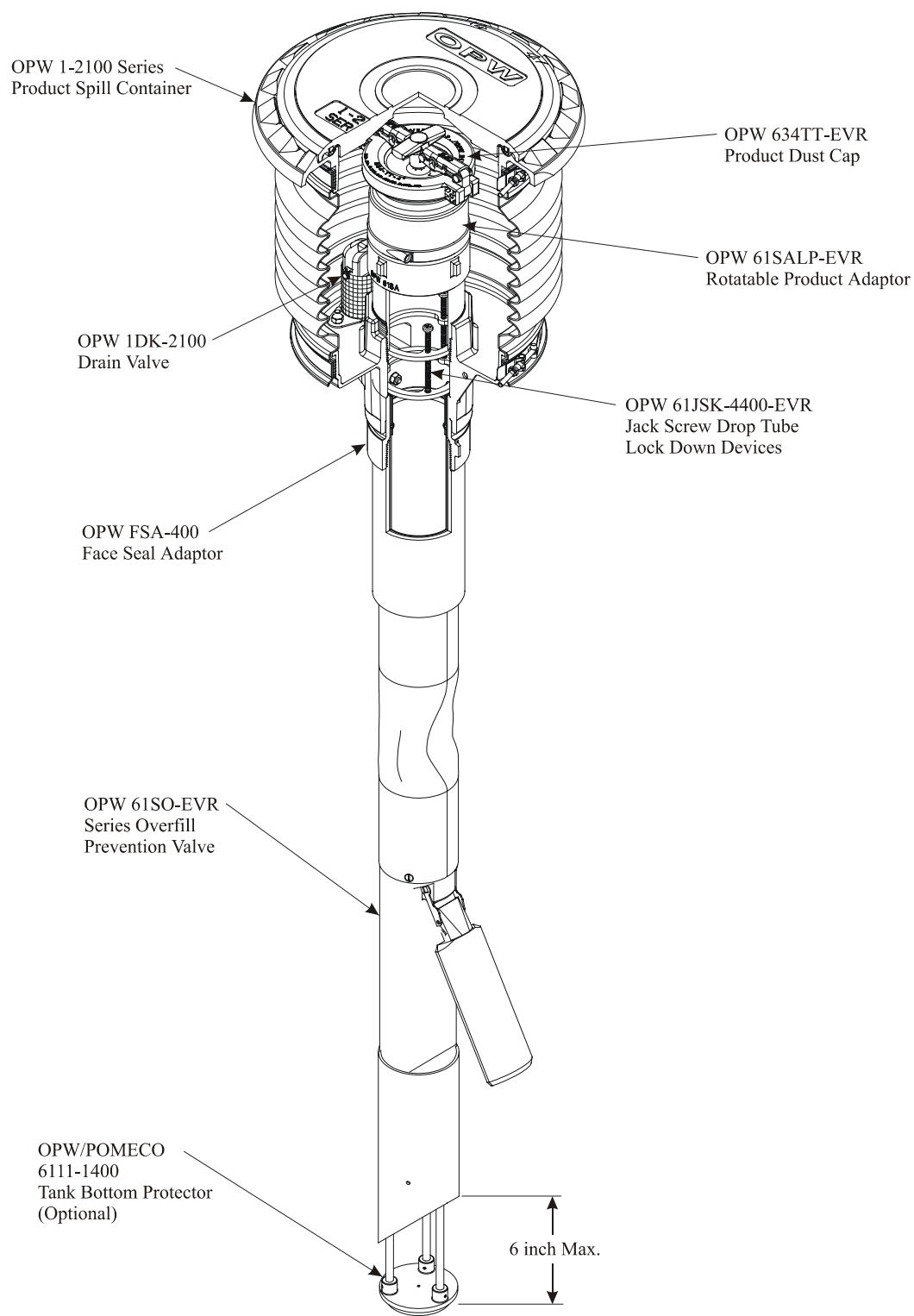


Figure 2D

Typical Vapor Recovery Installation Using OPW System

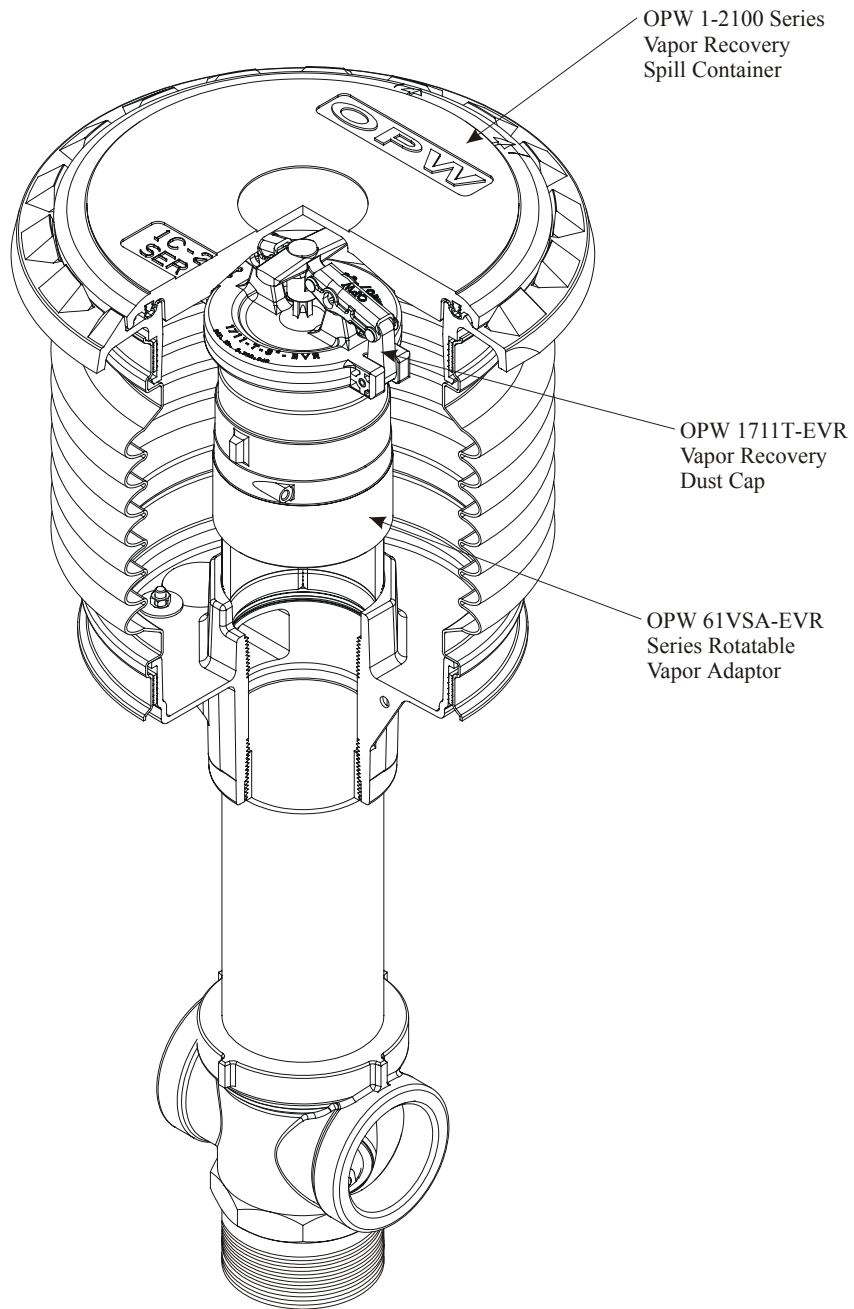


Figure 2E

OPW 1,1C, & 1SC-2100 Series Spill Container

**OPW/POMECO
Various Spill Container Configurations**

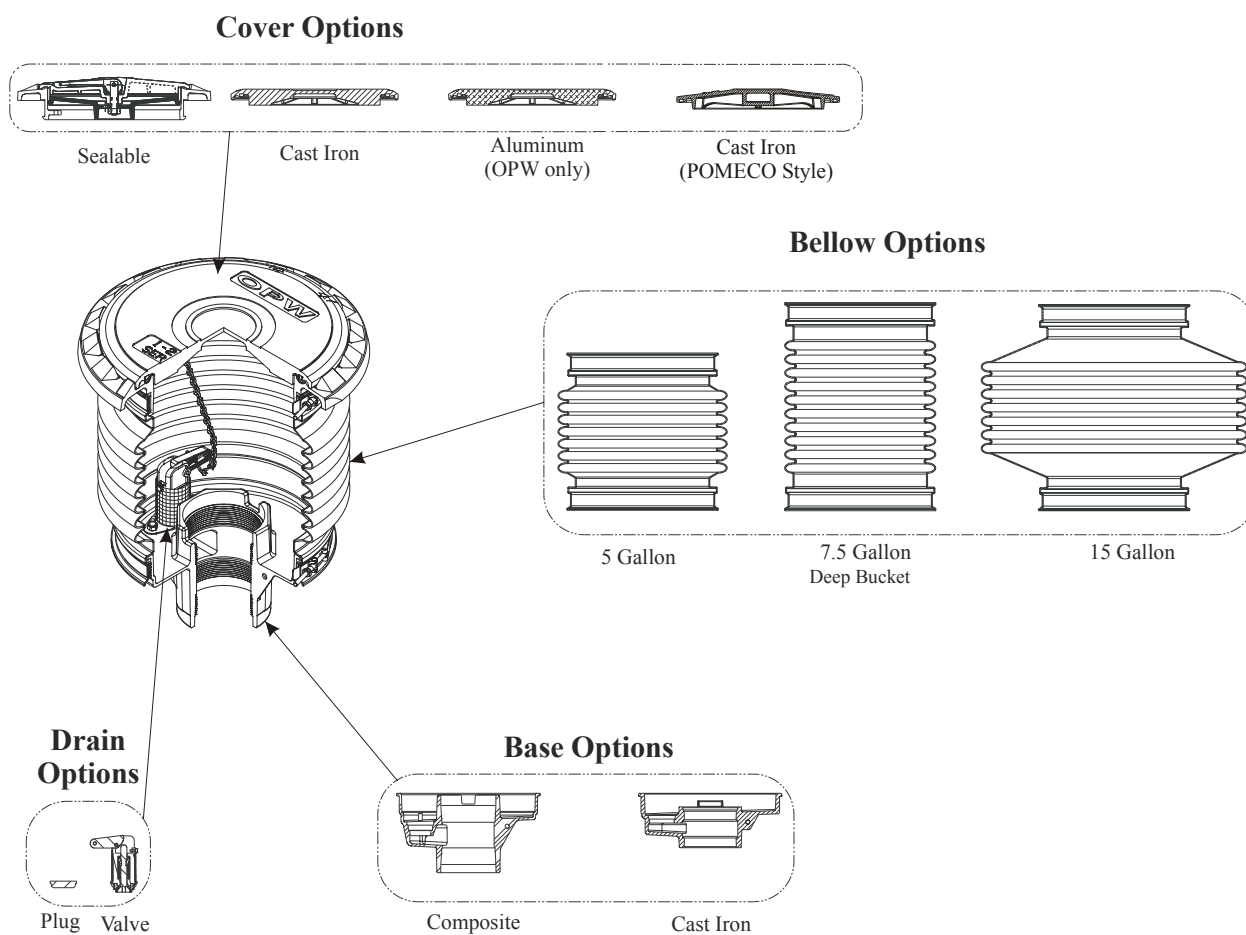


Figure 2E



OPW Installation and Maintenance Instructions

OPW 1-2100 Series Thread-On Grade Level Spill Containers

IMPORTANT: Please read these warnings and use the assembly instructions completely and carefully before starting. Failure to do so may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

IMPORTANT: The OPW 1-2100 Spill Container is pre-assembled for your convenience and ease of installation. Check to make sure the unit is intact and undamaged and all parts have been supplied. Never substitute parts for those supplied. Doing so may cause product failure.

WARNING-DANGER: Using electrically operated equipment near gasoline or gasoline vapors may result in a fire or explosion, causing personal injury and property damage. Be sure that the working area is free from such hazards, and always use proper precautions.

NOTE: At all times when product is in the storage tank keep the riser pipe capped, so the vapors cannot escape into the environment.

Notice: OPW products must be used in compliance with applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials, and specification are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

Standard Product Warranty

OPW warrants that products sold by it are free from defects in materials and workmanship for a period of one year from the date of manufacture by OPW (ECO products two years from date of manufacture.) Proof of purchase may be required. As the exclusive remedy under this limited warranty, OPW, will at its sole discretion, repair, replace, or issue credit for future orders for any product that may prove defective within the one year date of manufacture period (repairs, replacements, or credits may be subject to prorated warranty for remainder of the original warranty period, complete proper warranty claim

documentation required.) This warranty shall not apply to any product that has been altered in any way, which has been repaired by any party other than a service representative authorized by OPW, or when failure is due to misuse, or improper installation or maintenance. OPW shall have no liability whatsoever for special, incidental or consequential damages to any party, and shall have no liability for the cost of labor, freight, excavation, clean up, downtime, removal, reinstallation, loss of profit, or any other cost or charges.

For any product certified to California 2001 standards, OPW warrants that product sold by it are free from defects in material and workmanship for a period of one year from date of manufacture or one year from date of registration of installation not to exceed 15 months from date of manufacture by OPW.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

In California it is prohibit to use spill container drain valves on spill containers that are exclusively used for vapor return risers. Install only 1-2100 Series Thread-On spill containers models equipped with a drain plug.

1-2100 Series Performance Specifications:

This Spill Container drain valve has been manufactured and tested to the following California specifications: Leak Rate at 0.17 CFH @ 2.0 " W.C.

Torques Specification:

Spill Container 4" NPT, 125 ft-lbs minimum to 250 ft-lbs maximum.

4" Nipple, 4" NPT, 125 ft-lbs minimum to 250 ft-lbs maximum.

Drain Valve clamps, 5/16-18 UN thread, 11.5 ft-lbs minimum to 13.5 ft-lbs maximum.

**OPW NO. 1-2100 SERIES GRADE
LEVEL SPILL CONTAINER
INSTALLATION INSTRUCTIONS:**

Step 1.

Per California SB-989, all metal must be protected from direct contact with the elements. Coat stainless steel band clamps with the following approved coatings. OPW SL-1100, 3M Underseal 08883 or Polyguard Mastic CA-9. Only the threaded hardware needs to be coated in the field.

Step 2: (See Figure 1 & 2)

Set riser pipe. "L" is the distance between the top of the riser pipe and finish grade.

Model Series	"L" Dimension
1-2100, 5 Gallon	L=15" (38cm)
1-2100E, 7.5 Gallon (Deep Bellows Model)	L=21" (53cm)
1-2115, 15 Gallon	L=20" (51cm)

Note: If using OPW FSA-400, add 3-1/4" to Dimension "L".

Step 3:

Deburr and thoroughly clean riser pipe. Apply pipe dope to riser threads. Pipe dope to be a non-hardening, gasoline resistant pipe thread seal compound.

Step 4:

Install OPW FSA-400 Face Seal Adapter onto riser using the OPW 61SA-TOOL. Torque to 125 ft-lbs min. to 250 ft-lbs max. (4" NPT). Apply pipe dope to FSA-400. Pipe dope to be a non-hardening, gasoline resistant pipe thread seal compound.

Step 5:

Install spill container by rotating the mounting ring until hand tight.

NOTE: Do not attempt to completely tighten the container by using the mounting ring

Step 6:

Finish tightening the spill container with the OPW 61SA-TOOL. Torque to 125 ft-lbs min. to 250 ft. Lbs. max. (4" NPT)

Step 7: (See Figure 2)

Apply pipe dope to nipple and install. Pipe dope to be a non-hardening, gasoline resistant pipe thread seal compound. Use only factory made nipples. Nipples must be cut square and deburred. Torque to 125 ft-lbs min. to 250 ft-lbs max. (4" NPT). Torque value is based on rotation at the center of pipe. For standard cover models install adaptor and dust cap. For sealable cover (1SC) models, install a standard 4" pipe cap to support adjustment system. (Adaptor and

dust cap must be installed in sealable cover (SC) models after concrete has dried.

Note: Nipple length is determined by measuring from the bottom of the threaded portion of the base to the bottom of the cover. Then subtract 2" for clearance, height of adaptor and height of cap. Range of nipple lengths that can be used in all of the OPW spill containers: 4" minimum to 14" maximum.

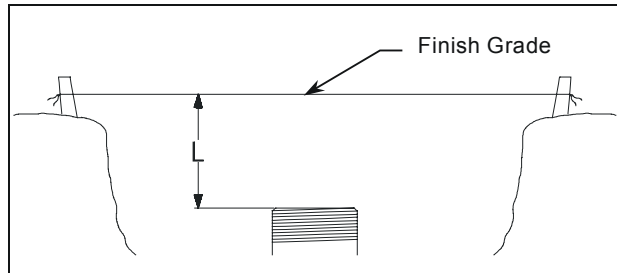


Figure 1

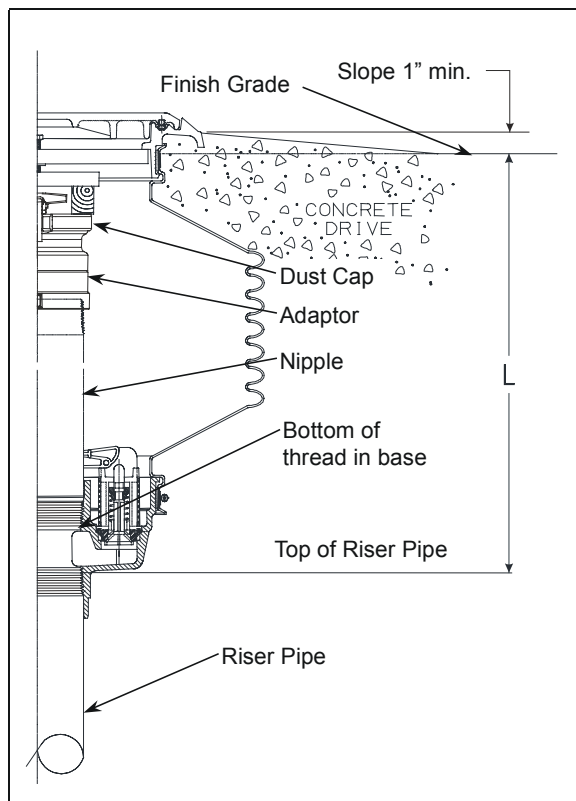


Figure 2

Step 8: (See Figure 3 & 4)

Install adjusting system beneath tabs on mounting ring. See Figure 3 for standard cover models. See Figure 4 for sealable cover models. Add shims as needed and adjust with screw. (Shims must be cut to size for sealable cover models.) The height can be increased up to 1" (2.5cm).

Note: The adjustment should not be more than 1" from the initial length of the unit.

Step 9:

Upon preliminary installation perform the California Test Procedures. Their Test Procedures will check the seals between the drain valve, nipple and rotatable adapter. To test the spill containers base and bellows fill the container with water. A drop in the water level of 1/16" or greater after one hour means that a leak exists. To determine where the leak is, look for a steady stream of bubbles coming from one of the joints or water leaking on the outside of the bucket. **NOTE:** Do not drain the water into the UST after the test is complete. Water must be disposed of per local requirements for hazardous waste. If the leak cannot be corrected the spill container should be replaced with another.

Step 10: (See Figure 2)

Before pouring concrete, place plastic over the cover and mounting ring protecting them from concrete splash. Double check that the unit is level and at proper grade height. Pour concrete per figure 2. Ramp or dome the concrete away from the mounting ring. There should be a minimum of 1" slope to finish grade. The concrete surface should start at the bottom edge of the watershed slots and tapered down to grade level.

NOTE: Do not stand on spill container before concrete sets up.

Remove plastic from cover after concrete has dried. Remove adjustment system. Adaptor and tight fill cap can now be installed in sealable cover models. Re-test the spill containers for leaks as described in step 9, after the concrete has set up.

Operation and Maintenance:

After each fuel delivery, the operator must remove any standing fuel from the container. Fuel can be removed by actuating the drain valve or with a gasoline absorbing disposable towel.

Annually: Inspect and clean the interior of the spill container and drain valve screen. Remove accumulated dirt and grit. If the drain valve screen becomes clogged, remove the valve, soak in water and use high-pressure air to clean. Reinstall the drain valve to its proper position and test the valve per the appropriate California Test Procedure. If problems persist, replace the drain valve with P/N 1DK-2100-EVR (specified torque 11.5 ft-lbs min to 13.5 ft-lbs

max, 5/16-18 UN thread). The sealable cover (1SC) adjustment nut is set at the factory, but due to environmental conditions it may be necessary to adjust it to either improve sealing or ease cover removal.

Important: Leave these instructions with Station Operator.

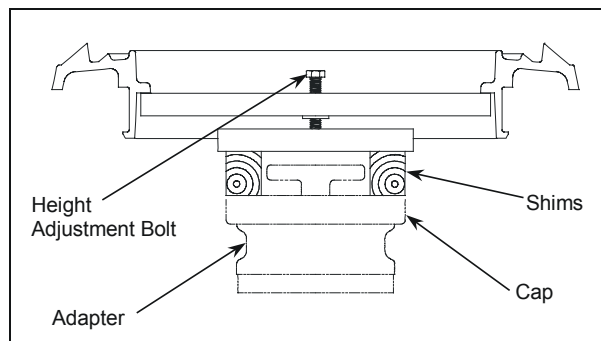


Figure 3 – Standard Cover Model Height Adjustment

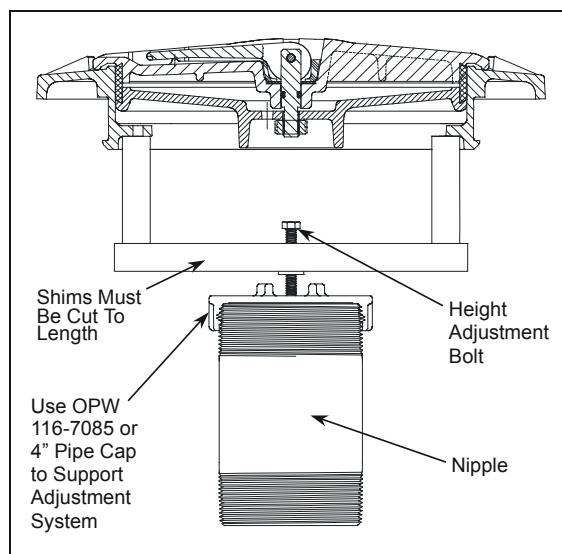


Figure 4 – Sealable Cover Model Height Adjustment



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Figure 2F



OPW Installation and Maintenance Instructions

OPW 1DK-2100 EVR Replacement Drain Valve

IMPORTANT: Please read these warnings and use the assembly instructions completely and carefully before starting. Failure to do so may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

IMPORTANT: Check to make sure the unit is intact and undamaged and all parts have been supplied. Never substitute parts for those supplied. Doing so may cause product failure and void warranty.

WARNING-DANGER: Using electrically operated equipment near gasoline or gasoline vapors may result in a fire or explosion, causing personal injury and property damage. Be sure that the working area is free from such hazards, and always use proper precautions.

NOTE: At all times when product is in the storage tank keep the riser pipe capped, so the vapors cannot escape into the environment.

The OPW 1DK is an optional drain valve replacement kit for the OPW 1 Spill containers series. It is designed to return incidental spillage of liquid back to the underground storage tank.

HOW TO INSTALL

1. Remove and discard existing drain valve and O-ring.
2. Clean any dirt or debris from the sealing surface where the new drain valve will be installed.
3. Apply any common grease or light oil to the new supplied O-ring. Assemble the O-ring into the spill container base.
4. Insert the 1DK into the spill container O-ring. Be sure that the drain valve seats flush with the floor of the spill container base.
5. The pull lever of the 1DK **MUST** be positioned halfway between the riser pipe nipple and the spill container bellows. Rotate the drain valve until that position is attained.
6. Secure the 1DK by installing the provided retaining clips and nuts. Tighten the nuts to a torque of 11.5 ft-lbs min. to 13.5 ft-lbs max.
7. The drain valve is now installed and ready for testing.

HOW TO TEST

Upon preliminary installation perform the California Test Procedures. Their Test Procedures will check the seals between the drain valve, nipple and rotatable adapter. To test the spill containers base and bellows fill the container with water. A drop in the water level of 1/16" or more after one hour means that a leak exists. To determine where the leak is, look for a steady stream of bubbles coming from one of the joints. **NOTE:** Do not drain the water into the UST after the test is complete. Water must be disposed of per local requirements for hazardous waste.

If a leak is observed in the Test Procedure, check to see that the drain valve poppet is sealing properly. To do this, lift up the drain valve pull chain several times to actuate the poppet. This will ensure that the drain valve poppet is seating properly. If this doesn't correct the leak remove the 1DK valve and inspect the O-ring for nicks or tears, replace if needed, also clean the sealing surfaces of the spill container base that the 1DK valve and O-ring are installed into. Reinstall 1DK valve and repeat test.

If spill container passes the Test Procedure but does not hold water then there is a leak in the bucket and will need to be replaced.

Operation and Maintenance:

To open, pull drain valve chain up and hold open until liquid is drained. To close, release chain

After each fuel delivery, the operator must remove any standing fuel from the container. Fuel can be removed by actuating the drain valve or with a gasoline absorbing disposable towel.

Annually: Inspect and clean the interior of the spill container and drain valve screen. Remove accumulated dirt and grit. If the drain valve screen becomes clogged, remove the valve, soak in water and use high-pressure air to clean. Reinstall the drain valve to its proper position and test the valve per the appropriate California Test Procedure

Important: Leave these instructions with Station Operator.

Notice: OPW products must be used in compliance with applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. OPW makes no warranty of fitness for a particular use. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials, and specification are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

Standard Product Warranty

OPW warrants that products sold by it are free from defects in materials and workmanship for a period of one year from the date of manufacture by OPW (ECO products two years from date of manufacture.) Proof of purchase may be required. As the exclusive remedy under this limited warranty, OPW, will at its sole discretion, repair, replace, or issue credit for future orders for any product that may prove defective within the one year date of manufacture period (repairs, replacements, or credits may be subject to prorated warranty for remainder of the original warranty period, complete proper warranty claim documentation required.) This warranty shall not apply to any product that has been altered in any way, which has been repaired by any party other than a service representative authorized by OPW, or when failure is due to misuse, or improper installation or maintenance. OPW shall have no liability whatsoever for special, incidental or consequential damages to any party, and shall have no liability for the cost of labor, freight, excavation, clean up, downtime, removal, reinstallation, loss of profit, or any other cost or charges.

For any product certified to California 2001 standards, OPW warrants that product sold by it are free from defects in material and workmanship for a period of one year from date of manufacture or one year from date of registration of installation not to exceed 15 months from date of manufacture by OPW.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.



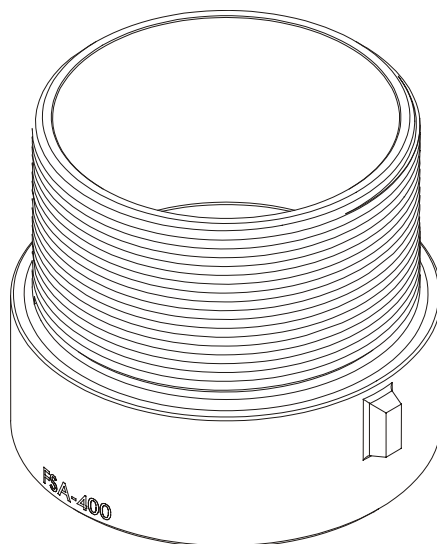
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Figure 2G

Gasket Seal Adaptor

OPW FSA-400 Face Seal Adaptor



Operation and Maintenance

1. Apply non-hardening, gasoline-resistant, pipe thread seal compound to the threads.
2. Tighten the FSA-400 onto the riser pipe with a torque of 125 ft-lbs minimum to 250 ft-lbs maximum. Use the OPW 61SA-TOOL to install.

Standard Product Warranty

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Figure 2H



OPW Installation and Maintenance Instructions

OPW 61SALP (Low Profile) Rotatable Product Adaptors

IMPORTANT: Please read these warnings and use the assembly instructions completely and carefully before starting. Failure to do so may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

IMPORTANT: Check to make sure the unit is intact and undamaged and all parts have been supplied. Never substitute parts for those supplied. Doing so may cause product failure.

WARNING-DANGER: Using electrically operated equipment near gasoline or gasoline vapors may result in a fire or explosion, causing personal injury and property damage. Be sure that the working area is free from such hazards, and always use proper precautions.

NOTE: At all times when product is in the storage tank keep the riser pipe capped, so the vapors cannot escape into the environment.

Notice: OPW products must be used in compliance with applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials, and specification are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

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misuse, or improper installation or maintenance. OPW shall have no liability whatsoever for special, incidental or consequential damages to any party, and shall have no liability for the cost of labor, freight, excavation, clean up, downtime, removal, reinstallation, loss of profit, or any other cost or charges.

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61SALP Performance Specifications:

This Rotatable Adaptor has been manufactured and tested to the following California Specifications: Rotatable 360°, Static Torque maximum 108 in-lbs.

Preventative Maintenance:

Annually, inspect the adaptor for large dents, cracks or deformation. Replace if necessary. The rotation mechanism is not field serviceable.

Replacement Parts:

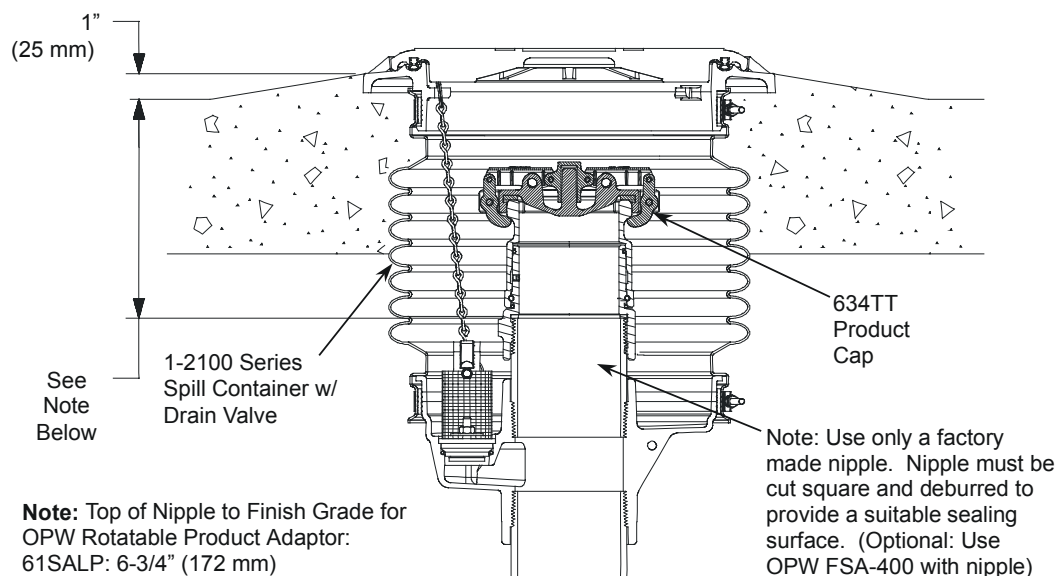
Nipple sealing gasket OPW P/N: H09039M.

Torque Specification:

Adapter, 4" NPSM, 90 ft-lbs minimum to 110 ft-lbs maximum.

<p>Important: Leave these Installation Instructions with the Station Operator.</p>

61SALP Rotatable Product Adaptor INSTALLATION INSTRUCTIONS



Step 1

The riser nipple in the spill container must be cut square and deburred. See drawing note for the correct distance between the top of the nipple and finished grade. (Optional: Use a OPW FSA-400 Face Seal Adapter with nipple. Add 3-1/4" to distance from top of nipple to finish grade).

Step 2 (Optional)

Apply pipe dope to the nipple. Pipe dope to be non-hardening, gasoline resistant pipe thread seal compound.

Step 3

Tighten the Rotatable Adaptor onto the nipple with a torque of 90 ft-lbs min. to 110 ft-lbs max this will be enough torque to seat and seal the gasket. Use an OPW 61SA-TOOL to install rotatable adaptor.



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Figure 2I



OPW Installation and Maintenance Instructions

OPW 61VSA Poppetted Rotatable Vapor Recovery Adaptor

IMPORTANT: Please read these warnings and use the assembly instructions completely and carefully before starting. Failure to do so may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

IMPORTANT: Check to make sure the unit is intact and undamaged and all parts have been supplied. Never substitute parts for those supplied. Doing so may cause product failure.

WARNING-DANGER: Using electrically operated equipment near gasoline or gasoline vapors may result in a fire or explosion, causing personal injury and property damage. Be sure that the working area is free from such hazards, and always use proper precautions.

NOTE: At all times when product is in the storage tank keep the riser pipe capped, so the vapors cannot escape into the environment.

Notice: OPW products must be used in compliance with applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials, and specification are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

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any party other than a service representative authorized by OPW, or when failure is due to misuse, or improper installation or maintenance. OPW shall have no liability whatsoever for special, incidental or consequential damages to any party, and shall have no liability for the cost of labor, freight, excavation, clean up, downtime, removal, reinstallation, loss of profit, or any other cost or charges.

For any product certified to California 2001 standards, OPW warrants that product sold by it are free from defects in material and workmanship for a period of one year from date of manufacture or one year from date of registration of installation not to exceed 15 months from date of manufacture by OPW.

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61VSA Performance Specifications:

This Rotatable Adaptor has been manufactured and tested to the following California specifications: Rotatable 360°, Static torque of 108 ft-lbs.

Preventative Maintenance:

Annually, inspect the adaptor for large dents, cracks or deformation. Replace if necessary. The rotation mechanism is not field serviceable.

Check the vapor poppet for damage and ensure that the poppet seats evenly with the adaptor. Remove any foreign objects from the vapor poppet's seal. The vapor poppet seal is not field serviceable.

Replacement Parts:

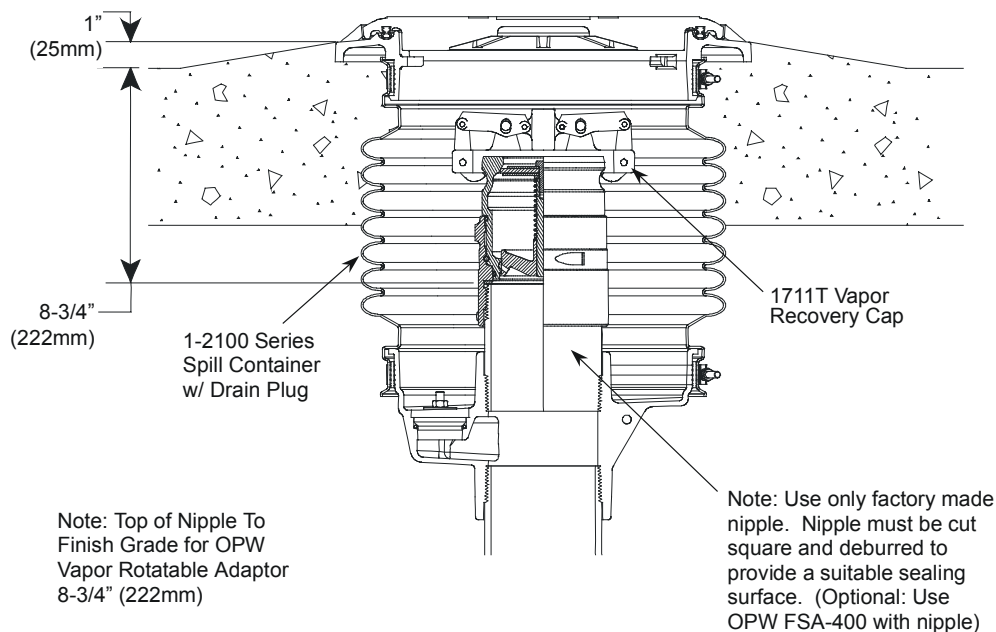
Nipple sealing gasket OPW P/N: H09039M.

Torque Specification:

Adaptor, 4" NPSM, 90 ft-lbs minimum to 110 ft-lbs maximum.

<p>Important: Leave these Installation Instructions with the Station Operator.</p>

OPW 61VSA Series Poppetted Rotatable Vapor Adaptor INSTALLATION INSTRUCTIONS



Step 1

The riser nipple in the spill container must be cut square and deburred. See drawing note for the correct distance between the top of the nipple and finished grade. (Optional: Use an OPW FSA-400 Face Seal Adaptor with nipple. Add 3-1/4" to distance from top of nipple to finish grade).

Step 2 (Optional)

Apply pipe dope to the nipple. Pipe dope to be non-hardening, gasoline resistant pipe thread seal compound.

Step 3

Tighten the Rotatable Adaptor onto the nipple with a torque of 90 ft-lbs min. to 110 ft-lbs max, this will be enough torque to seat and seal the gasket. Use a 61SA-TOOL to install rotatable adaptor.



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Figure 2J



OPW Installation Instructions 61SA-TOOL Multipurpose Installation Tool

IMPORTANT: Please read all warnings and follow the installation instructions completely and carefully. Failure to do so will void all warranties and may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

WARNING - DANGER: Using electrically-operated equipment near gasoline or gasoline vapors may result in fire or explosion, causing personal injury and property damage. Be sure that the working area is free from such hazards, and always use proper precautions.

WARNING: Proper operation is dependent on proper installation and regular maintenance. The following instructions are provided to assist you in properly installing rotating product adaptors and spill container. Failure to follow these instructions may cause failure to the system, resulting in a hazardous condition.

HOW TO USE 61SA-TOOL TO INSTALL A 61SA, 61VSA, 61SALP, AND FSA-400

- 1.) Slide the rotatable adaptor socket of the assembled tool onto the appropriate lugs of the necessary product. See Figure 1.
- 2.) Rotate the tool clockwise to tighten the product to the riser pipe.
- 3.) Remove handle by removing screw "A" and use the 7/8" hex to attach torque wrench and tighten to specified torque per each products instruction sheet.

CAUTION: DO NOT over torque product. Doing so may cause failure to the system resulting in a hazardous condition.

HOW TO USE 61SA-TOOL TO INSTALL A #1 SERIES SPILL CONTAINER BASE

- 1.) Remove the rotatable adaptor socket from the base bar by taking out screw "B". The finished assembly should be as seen in Figure 2.
- 2.) Slide the 61SA-TOOL onto the spill container base inside the appropriate slots.
- 3.) Rotate the tool clockwise to tighten the product to the riser pipe at the given torque values per the products instruction sheet.

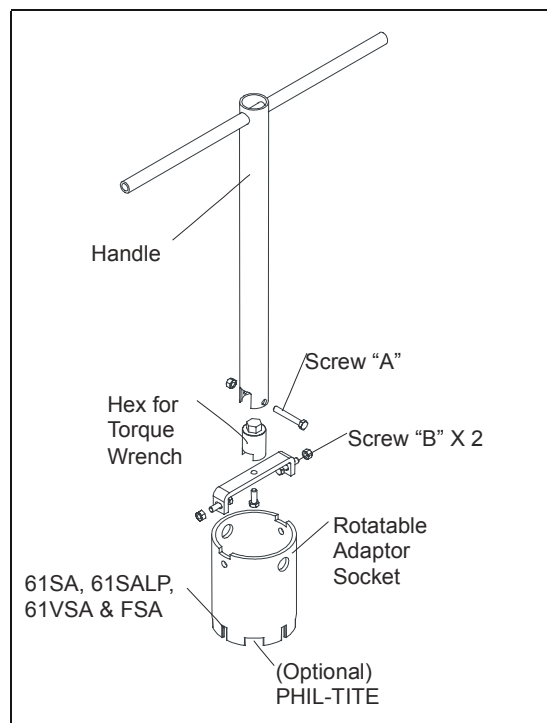


Figure 1

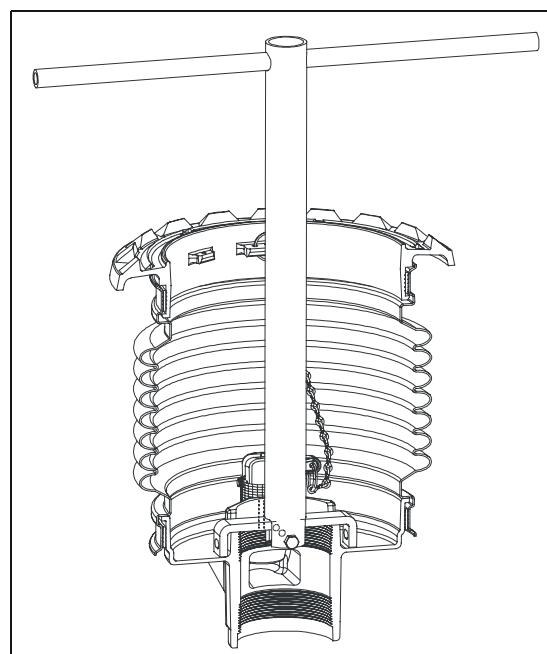


Figure 2

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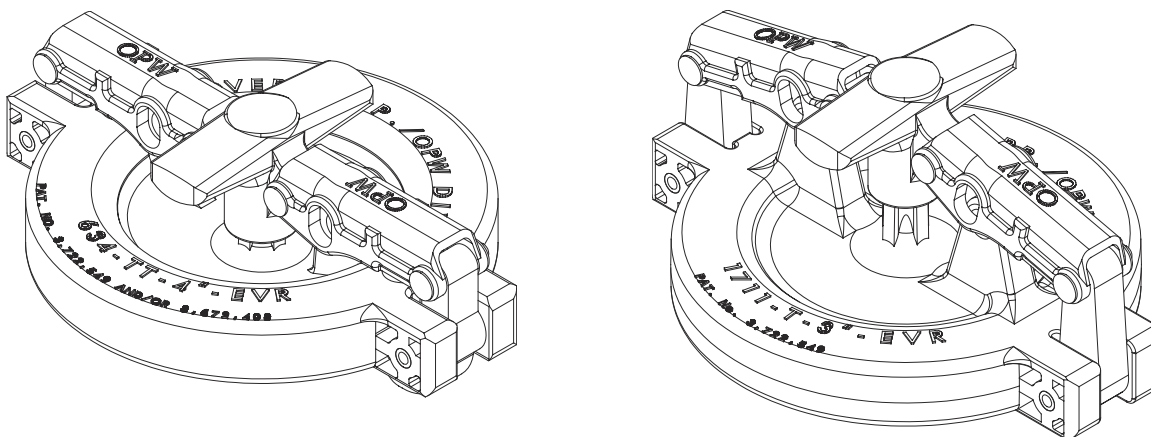


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Figure 2K

OPW 634TT-EVR and 1711T-EVR Dust Caps



Operation and Maintenance:

Annually inspect seal for nicks, tears or deformations. If required replace with OPW P/N: H15005M for 634TT and H10886M for 1711T.

Standard Product Warranty

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Figure 2L

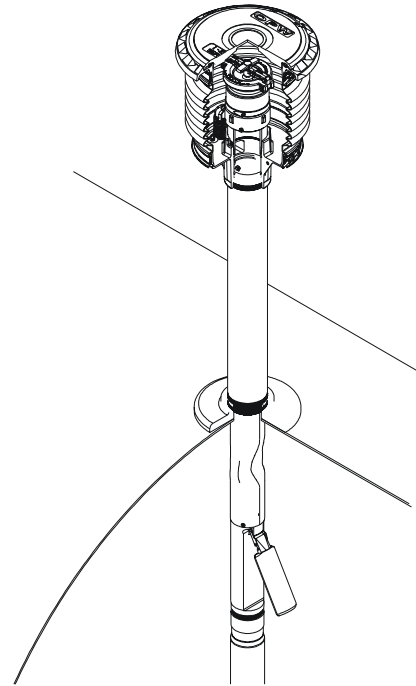
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September 2002



OPW Installation & Maintenance Instructions

ASSEMBLY, INSTALLATION, and
MAINTENANCE INSTRUCTIONS FOR
OPW 61SO-EVR VAPOR TIGHT, OVERFILL
PREVENTION VALVES.

IMPORTANT: Please read these assembly and
installation instructions completely and
carefully before starting.



Vapor Tight Overfill Prevention Valves

GENERAL INSTRUCTIONS

The OPW 61SO Overfill Prevention Valve is designed for tight fill, gravity drop applications to help prevent accidental or intentional overfilling of underground storage tanks. It is installed in the UST drop tube in place of a standard drop tube.

The main 61SO valve closes when liquid level is at 95% of the top of the tank. A small bypass valve remains open to allow the delivery hose to drain at 3-5 gallons per minute. If the delivery truck valve is not closed after initial shut-off, the bypass valve will close and will restrict all fuel delivery.

The 61SO-EVR models of the 61SO are designed to be installed with the following OPW products: FSA-400 Face Seal Adapter, 1-2100-EVR Series Spill Container or POMECO Multi-port, 61JSK Jack Screw Kit, 61SALP-EVR Series Rotatable Product Adaptor, and 634TT-EVR Series Product Cap.

IMPORTANT

Read these assembly and installation instructions completely and carefully prior to starting. Check to make sure all parts have been provided. Use only the parts supplied; substitution of parts may cause product failure.

Failure to follow instructions may cause improper product operation or premature failure which may permit storage tank overfill. An overfilled storage tank may create hazardous conditions and/or environmental contamination.

CAUTION

Do not remove elastic band from around float until instructed to do so, as damage to valve may result.

WARNING

Failure to properly connect delivery hose and elbow, and/or disconnecting a liquid filled delivery hose or elbow will result in a hazardous spill, which may result in personal injury, property damage, fire, explosion, and water and soil pollution.

- Make sure all connections, including the hose and elbow connections, between storage tank and transport are securely coupled.
- Make sure the lip seal and/or all gaskets in the delivery elbow are properly in place to prevent spills.
- Do not operate with damaged or missing parts, which prevent tight connections.

Normal Operation: A Hose "Kick" and reduced flow signal that the tank is full. Close transport delivery valve and drain hose into tank before disconnecting any hose fitting.

Overfilled Tank: Failure of the hose to drain after closing the delivery valve signals an overfilled tank. Do Not Disconnect any delivery hose fitting until the liquid level in the tank has been lowered to allow the hose to drain into the tank. **Attention:** In the event you are splashed, remove all wetted clothing immediately. Do not go into an enclosed area and stay away from ignition sources.

IMPORTANT

Determine if the underground storage tank is equipped with a ball float vent valve similar to the OPW 53VM, as illustrated in Figure 16. In all systems, the shut-off point of the 61SO must be reached before the ball float reduces flow to ensure proper overfill valve operation.

TOOLS NEEDED FOR INSTALLATION AND ASSEMBLY:

1. Drill
2. A sharp 1/8" pilot drill bit
3. A sharp 5/16" drill bit
4. Tape measure
5. Hacksaw or cut-off saw, fine tooth; 24 teeth/inch
6. Fine half round file
7. Screwdriver - flat blade
8. 1/2" Wrench
9. Two-part sealant (Supplied)
10. Torque Wrench

WARNING

Using electrically operated equipment near gasoline or gasoline vapors may result in fire or explosion, causing personal injury and property damage. Check to assure the working area is free from such hazards, and always use proper precautions.

HOW TO LOCATE THE POSITION OF THE 61SO AT 95% TANK CAPACITY

The length of the upper tube and the placement of the 61SO valve body determine the shut-off point. Following the standard instructions for the OPW 61SO will provide for initial shutoff at 95%. In all cases, the upper tube length must be a minimum of 6-1/2" plus the length of the riser pipe. All length measurements are in inches.

INSTRUCTIONS

- 1.) Find tank capacity (in gallons) from tank calibration chart provided by tank manufacturer.
- 2.) Calculate 95% of capacity.
- 3.) Locate the 95% volume number on the tank calibration chart.
- 4.) Find the dipstick number (X) which corresponds to the 95% tank volume. And, find the dipstick number (Y) which corresponds to the 100% volume.
- 5.) Subtract the dipstick number (X) from the tank diameter (Y) to find the upper tube reference number (Z).
 $(Y) - (X) = (Z)$
- 6.) Subtract 2" from (Z) to find the upper tube depth (C).
 $(Z) - 2" = C$
- 7.) Is C less than 6-1/2"?

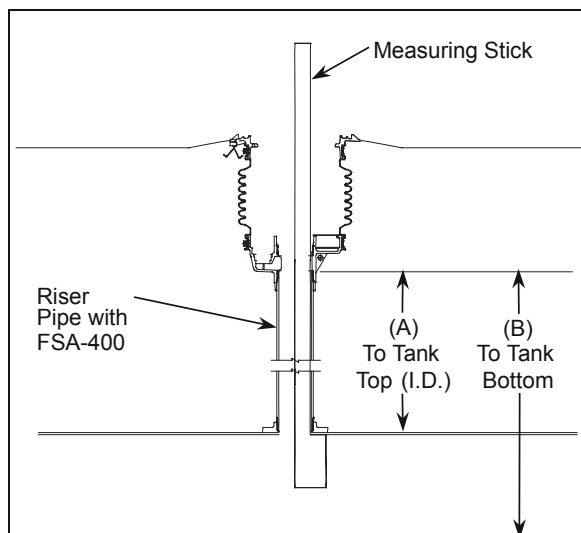
NO Upper tube length is C plus the distance from the top of the FSA-400 Face Seal Adaptor installed on the riser pipe to the inside, top lip of the storage (A).

$$\text{Upper Tube Length} = C + (A)$$

YES Upper tube length is 6-1/2" plus the riser pipe measurement (A).

$$\text{Upper Tube Length} = 6\text{-}1/2" + (A)$$

NOTE: You must find the actual tank capacity number that correlates to the 6-1/2" + (A) depth for the station records. This number may also be used for the purposes of calibrating an electronic tank level system.



EXAMPLE

- 1.) For an Owens-Corning Model G-3 Fiberglass® Tank Calibration Chart:
 Tank Capacity - 10,000 gal., nominal 9,403 gal.
NOTE: Use actual capacity only
 - 2.) 95% of actual tank capacity = $0.95 \times 9403 \text{ gal.} = 8933 \text{ gal.}$
 - 3.) The closest number which is less than 8933 gal. is 8910 gal. Choosing the closest number less than 95% of actual capacity ensures that the initial shutoff will occur when the tank is no more than 95% full.
 - 4.) The calibration chart reading of 8910 gal. corresponds to a dipstick measurement of 82".
 - 5.) Dipstick number (X) = 82"
 Tank diameter (Y) = 92"
 $(X) - (Y) = (Z) \quad (92" - 82" = 10")$
 $(Z) = 10"$
 - 6.) $(Z) - 2" = C \quad (10" - 2" = 8")$
 $C = 8"$
 - 7.) Is 8" less than 6-1/2"?
- NO** Measure the distance from the top of the FSA-400 Face Seal Adaptor installed on the riser pipe to the inside, top lip of the storage tank and obtain measurement (A).
- $$\text{Upper tube length} = C + (A)$$

ASSEMBLY INSTRUCTIONS

IMPORTANT: Each of the numbered steps in the installation instructions are designed as a CHECK LIST to insure proper installation and trouble free operation of the OPW 61SO Overfill Prevention Valve.

Read and follow these steps carefully, checking them off as you proceed.

Figure numbers correspond to step numbers for easy reference.

STEP 1: MEASURE

Install the OPW FSA-400 Face Seal Adaptor and the 1-2100-EVR Series Thread-on Spill Container on the Fill Riser (Refer to the Installation Instructions Supplied with the 1-2100-EVR Series Spill Container). Insert the 61SO measuring stick through the riser pipe and hook it under the inside of the tank in the lengthwise direction. Mark the measuring stick at the top of the FSA-400 threads inside the base of the spill container bucket just below the drain valve outlet window (See Figure 1 & 1A). The top flange on the 61SO will rest on the FSA-400 just below the drain valve outlet, and be locked in place between the FSA-400 and the 4" nipple that is installed in the spill container with the 61JSK-4400 Jack Screw Kit (See Figure 1A). (For riser pipe configurations other than that shown, consult installation drawings or use other necessary means to measure Dimension "A").

Using a tape measure, measure the distance from the top of the FSA-400 in the spill container to the bottom of the tank (Dim. "B").

IMPORTANT: Inspect the riser pipe for any foreign material. Over spray from tank relining or any internal burrs inside of pipe must be removed prior to installation. Failure to have an unobstructed riser pipe may prevent proper installation and operation of the valve. The 61SO is designed to be installed into schedule 40 riser pipes. The 61SO cannot be installed into schedule 80 riser pipes.

STEP 2: MARK THE TUBE

Use the result from STEP 1 and HOW TO LOCATE THE POSITION OF THE 61SO AT 95% TANK CAPACITY to mark the upper tube. Measure the distance from the point where the upper tube and valve body meets as shown in Figure 2.

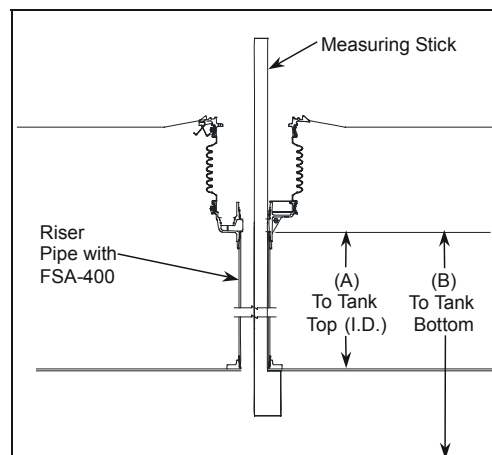


Figure 1

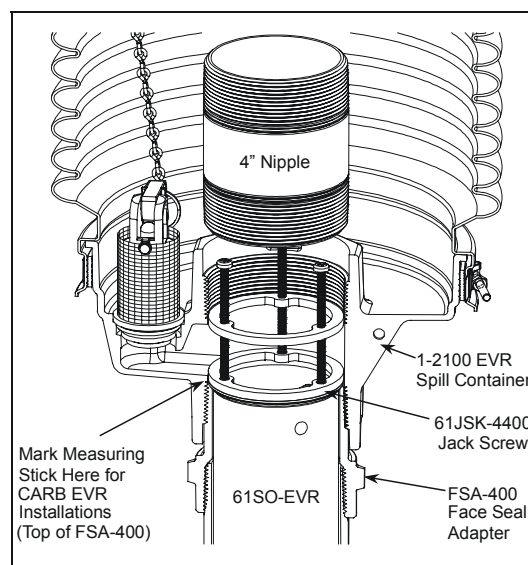


Figure 1A

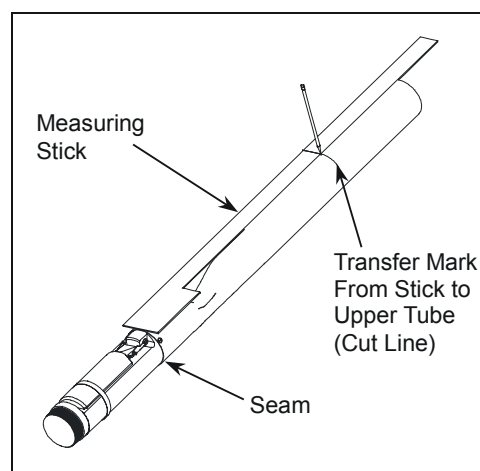


Figure 2

STEP 3: CUT THE UPPER DROP TUBE

Carefully saw through the tube squarely, at the mark made in Step 2. Use a hacksaw with a new fine-tooth blade. Rotating the upper tube as the sawing progresses will minimize run out and ensure a square 90-degree cut. A piece of paper, taped square with the tube or a hose clamp can be use as guides for making a square cut.

CAUTION -DO NOT use a pipe or tubing cutter to cut the upper drop tube, this may damage the tube, causing it to be out of round thereby prohibiting assembly of the unit.

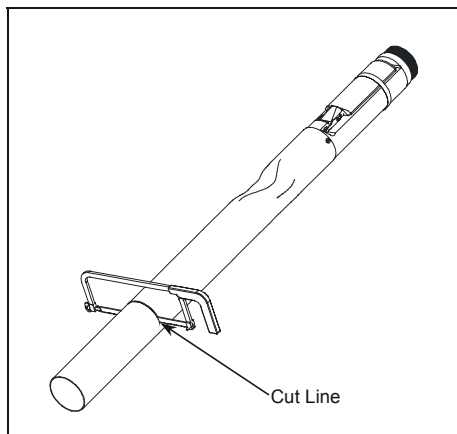


Figure 3

STEP 4: FILE THE DROP TUBE

File the upper tube square, and remove any burrs or rough edges. Make sure the cut is flat and square.

IMPORTANT: Carefully file a **good chamfer** on the inside of the drop tube to provide a lead-in for the o-ring and inlet tube to be installed in step 6.

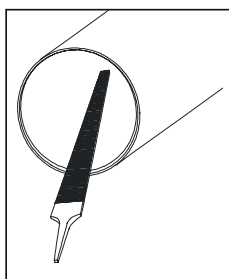


Figure 4

Caution: Failure to properly apply and cure sealant may result in a failure of a pressure decay leak test.

STEP 5: APPLY SEALANT

Prepare sealant by thoroughly mixing 1/3 of each packet together until color is uniform.

Generously apply sealant to the inside diameter of the upper drop tube. Make

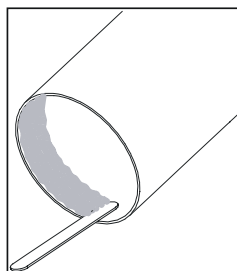


Figure 5

sure coverage is completely around the tube as shown in Fig. 5.

STEP 6: INSTALL INLET TUBE

Install o-ring in the o-ring groove of inlet tube (DO NOT USE GREASE). Insert the inlet tube into the upper tube until it seats against the flange on the upper inlet tube.

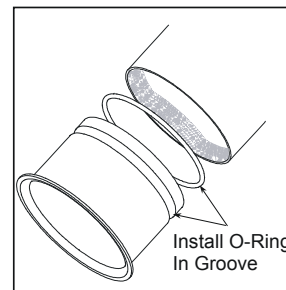


Figure 6

STEP 7: DRILL HOLES

With the inlet tube in place, carefully drill (3) 1/8" diameter pilot holes through the drop tube and inlet tube at three locations at 120 degree intervals around the tube, 1 inch below the flange. Using the pilot holes, drill (3) 5/16" dia. holes through the tubes. Remove the burrs from the drilling operation from the inside of the drop tube assembly with a fine half round file.

IMPORTANT: A 5/16" drill bit must be used. Do not substitute any other size drill bit.

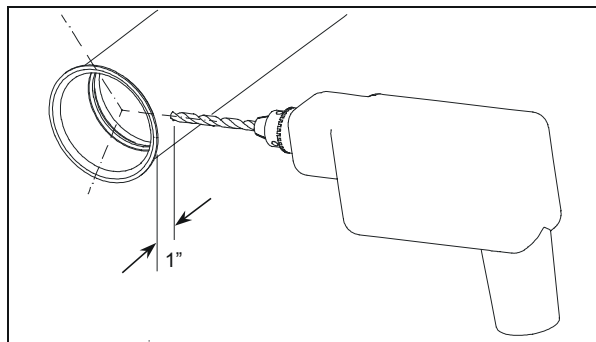


Figure 7

STEP 8: ASSEMBLE AND SEAL CLINCH STUDS

Loosely assemble the three (3) clinch studs, lock washers, and nuts in holes. Do not tighten at this time. Mix up a small amount of sealant. Generously apply sealant underneath each clinch stud head, each nut, and on the outside of the tube around the holes.

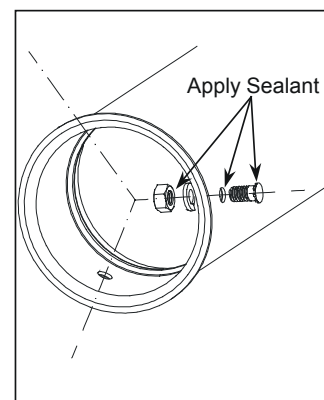


Figure 8

STEP 9: TIGHTEN SELF-CLINCHING STUDS

Tighten clinch studs securely with a ½" wrench. Use only the self-clinching studs that are supplied with the unit. Seating torque is 11.5 ft-lbs min. to 13.5 ft-lbs max. Do not over tighten.

Note: Failure to properly apply and cure the sealant may result in a failure of a pressure decay leak test.

STEP 10: LOWER TUBE ASSEMBLY

If a vise is used, clamp on the valve body casting only to avoid damage to the float. Mix the remaining sealant until the color is uniform. Using the mixing stick, **generously apply sealant to the first 6 male threads on the valve body** as shown in figure 10. Make sure coverage is completely around the threads, and work the sealant down into the thread profile. Quickly thread the lower tube onto the valve body. Tighten the tube securely by hand or with a strap wrench. Remove excess sealant and smooth sealant bead with water moistened mixing stick.

Important: Allow sealant (epoxy) to cure for 24 hours before installing into tank.

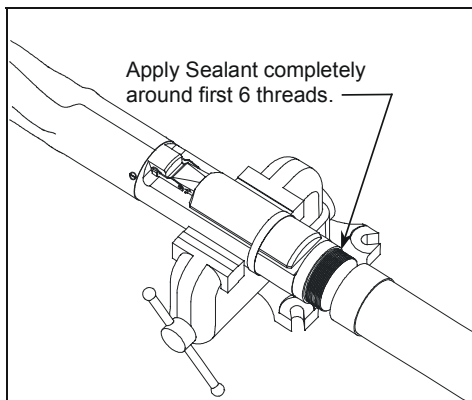


Figure 10

Note: Before installing the valve in the tank, a pressure test can be performed on the valve to check for vapor tightness. Seal off both ends of the tube with inflatable plumber's plugs. Apply a maximum 10" W.C. (1/3 PSI) air pressure. If pressure does not hold and a leak can be located with soap solution, do not install the valve. Send the valve back to OPW for warranty evaluation.

Caution: Do not over-pressure. Excess pressure can damage the valve

STEP 11: CUT LOWER TUBE AT 45° ANGLE

Measuring from the underside of the inlet tube flange, mark the overall length of the drop tube a distance of (B) minus 6" or as per local codes or

requirements. Determine dimension (B) from the measurements taken in Step 1, Figure 1 (Top of the FSA-400 below the drain valve outlet in the spill container to the bottom of the tank). Saw off the excess tube at a 45-degree angle and file off any sharp burrs (Refer to Figure 16). Optional: Install the OPW/POMECO Tank Bottom Protector on the lower tube (Refer to Installation instructions supplied with the 6110 Tank Bottom Protector).

STEP 12: PREPARE FILL RISER FOR VALVE INSERTION

IMPORTANT: Inspect the riser pipe for any foreign material. Over spray from tank relining or any internal burrs inside of pipe must be removed prior to installation. Failure to have an unobstructed riser pipe may prevent proper installation or operation of the valve. Thoroughly clean top of riser pipe.

Important: Before installing the valve, allow sealant to cure for 24 hours.

STEP 13: REMOVE ELASTIC BAND

Remove the elastic band securing the float to the valve body. The float will move into an outward position.

STEP 14: INSERT DROP TUBE

Make sure the O-Ring gasket is under the flange of the inlet tube. Hold the float down against the valve body and slowly insert the drop tube overfill valve into the riser pipe. Do not force valve into the riser pipe. If any obstruction or foreign matter interferes with smooth insertion of the valve, the riser pipe must be cleared.

WARNING

Failure to follow the assembly and installation instructions or use of excessive force to insert the OPW 61SO will VOID THE WARRANTY!

Difficulty in removing the existing fill tube (if there is one) means there may be an obstruction in the riser pipe. Look for burrs, deformations, excess tank lining material or other projections that may interfere with easy insertion of the OPW 61SO. The 61SO is designed for insertion into schedule 40 pipe. If

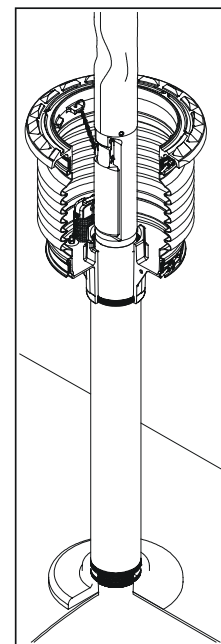


Figure 14

schedule 80 pipe has been used for the riser, the 61SO can not be installed. If seamed pipe has been used, the internal weld bead may interfere with the OPW 61SO and prevent installation. If the OPW 61SO won't slip in easily DON'T FORCE IT! Damage to the valve may result if excess force is used. Examine the riser pipe carefully; determine the nature of the obstruction; take appropriate steps to remove it.

STEP 15: CHECK INSTALLATION

Insert the drop tube all the way into the tank until the flange and gasket seat onto the top of the FSA-400. The float will swing out into the operating position as it passes into the tank. Make sure that the float is aligned along the length of the tank. The length of the tank can easily be determined by locating other manholes or pump boxes that are installed around other tank fittings. Look into the drop tube and align the deflector with the length of the tank. **CAUTION:** No obstruction in the tank can be within 13" from the center of the riser pipe or the valve may not operate properly.

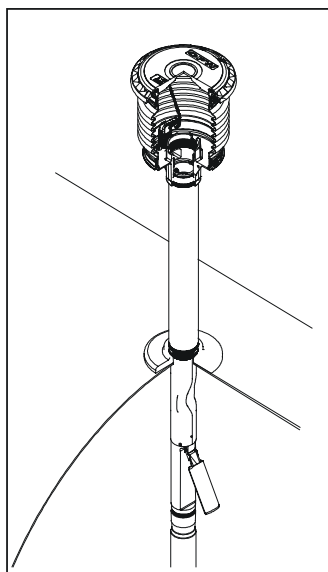


Figure 15

STEP 16: ALIGN VALVE

Install the OPW JSK-4400 Jack Screw Kit and a 4" nipple to lock the valve in place. Refer to the Installation Instructions supplied with the Jack Screw Kit. Install the 61SALP-EVR Rotatable Product Adaptor (Refer to Installation Instructions supplied with the 61SALP-EVR.) Make sure that the valve does not rotate while tightening the adaptor by observing the position of the deflector. **The valve must remain aligned along the length of the tank as in Step 15.** Repeat this step as necessary to assure proper valve alignment.

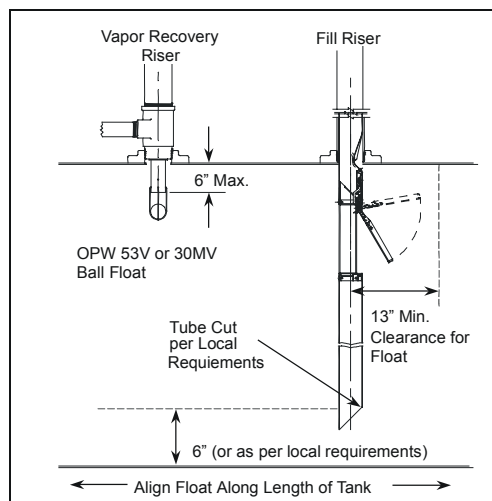


Figure 16

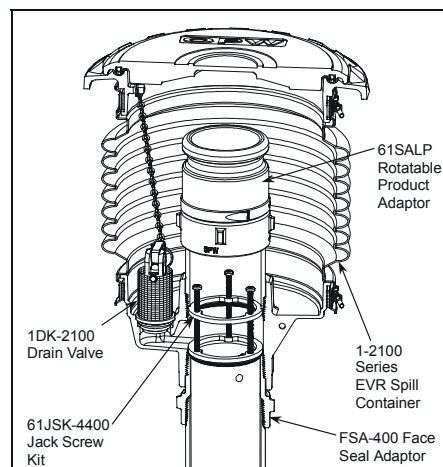


Figure 16A

STEP 17: INSTALL WARNING PLATE

Slide the tie wrap over the warning plate ears and position warning plate against riser pipe approximately 1" below the adaptor. Tighten the tie wrap securely. The valve is now fully installed and in operating position.

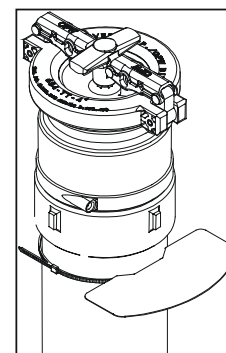


Figure 17

STEP 18: VALVE REMOVAL

The valve can be removed for tank leak testing, inspection, etc., by removing the 61SALP-EVR Rotatable Product Adaptor, the 4" nipple, and the 61JSK-4400 Jack Screw Kit. Reinstall per the above instructions.

Step 19: Electronic Liquid Level Monitoring

If an electronic level monitor is installed, it must be calibrated to match the top of the 61SO valve body, which must correlate with 95% of the actual tank capacity.

PREVENTATIVE MAINTENANCE

Annually, inspect the flapper in the 61SO to see that it is open by looking down the drop tube opening.

CAUTION: Do not insert any foreign object into drop tube if flapper is in the closed position. For example a tank level measuring stick. This will damage the valve and void the Warranty. ALWAYS check flapper location before “sticking” the tank. If flapper is in the closed position the tank is either over filled and you need to wait until the liquid level goes down or the 61SO is damaged and needs to be replaced.

61SO Performance Specifications:

This Overfill Prevention Valve has been manufactured and tested to, and met the following California specifications. Performance Requirement: Leak rate at 0.17 @ 2.0"W.C.

Torque Specification:

Self-Clinching Studs, 5/16-8 UN thread, 11.5 ft-lbs minimum to 13.5 ft-lbs maximum.

Important: Leave these installation instructions and maintenance procedures with the station operator.

Notice: OPW products must be used in compliance with applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials, and specification are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

Standard Product Warranty

OPW warrants that products sold by it are free from defects in materials and workmanship for a period of one year from the date of manufacture by OPW (ECO products two years from date of manufacture.) Proof of purchase may be required. As the exclusive remedy under this limited warranty, OPW, will at its sole discretion, repair, replace, or issue credit for future orders for any product that may prove defective within the one year date of manufacture period (repairs, replacements, or credits may be subject to prorated warranty for remainder of the original warranty period, complete proper warranty claim documentation required.) This warranty shall not apply to any product that has been altered in any way, which has been repaired by any party other than a service representative authorized by OPW, or when failure is due to misuse, or improper installation or maintenance. OPW shall have no liability whatsoever for special, incidental or consequential damages to any party, and shall have no liability for the cost of labor, freight, excavation, clean up, downtime, removal, reinstallation, loss of profit, or any other cost or charges.

For any product certified to California 2001 standards, OPW warrants that product sold by it are free from defects in material and workmanship for a period of one year from date of manufacture or one year from date of registration of installation not to exceed 15 months from date of manufacture by OPW.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.



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Figure 2M



OPW Installation and Maintenance Instructions

OPW 61JSK-4400 Jack Screw Kit

IMPORTANT: Please read these warnings and assembly instructions completely and carefully before starting. Failure to do so may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

IMPORTANT: Check to make sure the product is intact and undamaged and all parts have been supplied. Never substitute parts for those supplied. Doing so may cause product failure.

WARNING-DANGER: Using electrically operated equipment near gasoline or gasoline vapors may result in a fire or explosion, causing personal injury and property damage. Be sure that the working area is free from such hazards, and always use proper precautions.

NOTE: At all times when product is in the storage tank keep the riser pipe capped, so the vapors cannot escape into the environment.

Notice: OPW products must be used in compliance with applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials, and specification are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

Standard Product Warranty

OPW warrants that products sold by it are free from defects in materials and workmanship for a period of one year from the date of manufacture by OPW (ECO products two years from date of manufacture.) Proof of purchase may be required. As the exclusive remedy under this limited warranty, OPW, will at its sole discretion, repair, replace, or issue credit for future orders for any product that may prove defective within the one year date of manufacture period (repairs, replacements, or credits may be subject to prorated warranty for remainder of the original warranty period, complete proper warranty claim documentation required.) This warranty shall not apply to any product that has been altered in any way, which has been repaired by any party other than a service representative

authorized by OPW, or when failure is due to misuse, or improper installation or maintenance. OPW shall have no liability whatsoever for special, incidental or consequential damages to any party, and shall have no liability for the cost of labor, freight, excavation, clean up, downtime, removal, reinstallation, loss of profit, or any other cost or charges.

For any product certified to California 2001 standards, OPW warrants that product sold by it are free from defects in material and workmanship for a period of one year from date of manufacture or one year from date of registration of installation not to exceed 15 months from date of manufacture by OPW.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

61JSK-4400 Performance Specifications:

This OPW Jack Screw Kit is designed to lock an OPW 61SO-EVR Series Overfill Valve or 61T Drop Tube into an OPW 1-2100-EVR Series Spill Container Base below the outlet of the drain valve.

Torque Specification:

1/4-20 Screw, 3.0 ft-lbs minimum to 4.5 ft-lbs maximum.

4" Nipple, 125 ft-lbs minimum to 250 ft-lbs maximum.

4" NPT Thread, 125 ft-lbs minimum to 250 ft-lbs maximum.

OPW NO. 61JSK-4400 JACK SCREW KIT INSTALLATION INSTRUCTIONS:

Step 1

Remove any old or dried pipe dope and metal burrs from top of riser pipe. Apply a gasoline resistant pipe dope on the threads of an OPW FSA-400 Face Seal Adapter and install onto the riser pipe. Torque to 125 ft-lbs min. to 250 ft-lbs max, 4"NPT using the OPW 61SA-TOOL.

Step 2:

Install the OPW 1-2100-EVR or POMECA 500 Series Spill Container in accordance with the OPW Installation Instructions supplied with the product.

Step 3: (See Figure 2 & 2A)

Assemble and Install the OPW Drop Tube in accordance with the OPW Installation Instructions supplied with the product.

Step 4: (See Figure 3)

Insert the Jack Screw Lower Plate (plate without threads) completely into the spill container base on top of the drop tube flange with the screw pockets facing up.

Step 5: (See Figure 5)

Assemble screws into upper plate. Adjust the screws so that the top plate will be located just below the bottom of the threads in the spill container base when the assembly is inserted into the spill container. Apply the supplied thread sealant to the threads above the top plate on all three screws on the Jack Screw Top Assembly.

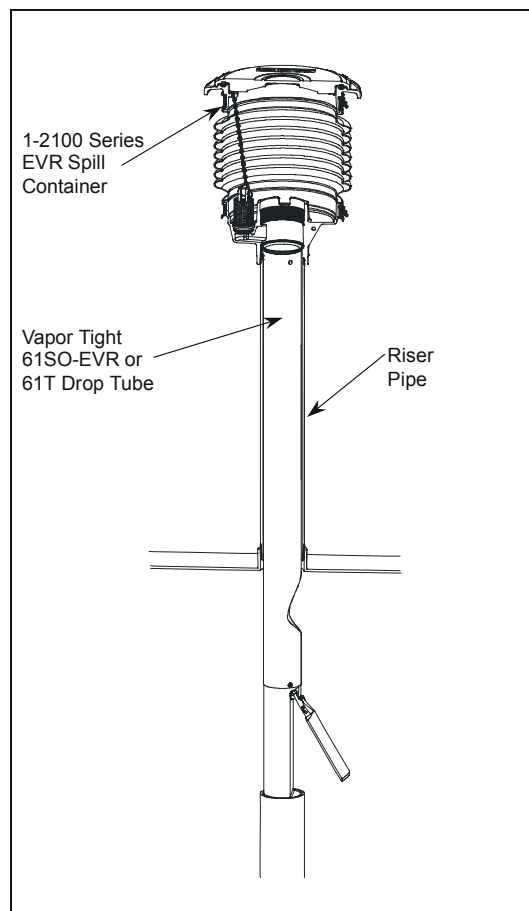


Figure 2a

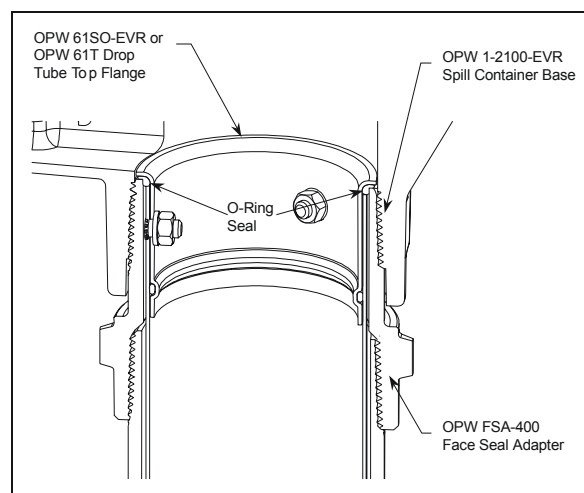


Figure 2

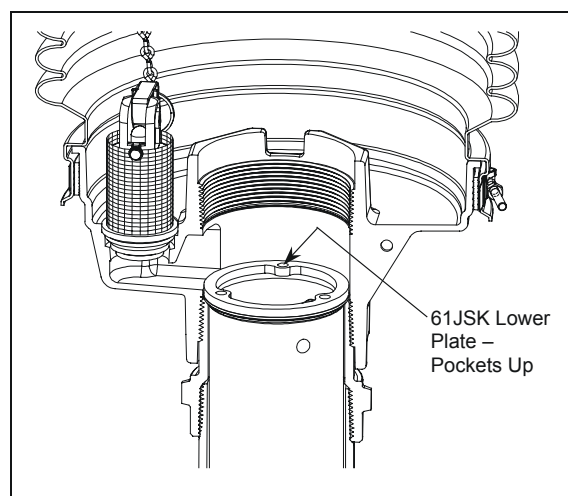


Figure 3

Step 6: (See Figure 5)

Install the Jack Screw Assembly into the spill container base. Make sure the bottoms of the three screws are seated in the pockets on the Jack Screw Lower Plate.

Step 7: (See Figure 6)

Apply a gasoline resistant pipe dope on the threads of a 4" nipple. Install the 4" nipple into the spill container and tighten securely. (Recommended torque, 4"NPT, 125 ft-lbs min. to 250 ft-lbs max.)

Note: The top plate should not be in contact with the nipple at this point. If the nipple hits the top plate while being tightened, remove the nipple, lower the top plate on the jack screw below the threads on the spill container, and then reinstall the nipple.

Step 8: (See Figure 7)

Using a long screwdriver, alternately and evenly tighten the three (3) screws on the Jack Screw Assembly until the Upper Plate contacts the bottom of the 4" nipple. Tighten the three (3) screws evenly and securely with a torque of 3.0 ft-lbs min. to 4.5 ft-lbs max to ensure that the drop tube flange is sealed securely to the riser pipe.

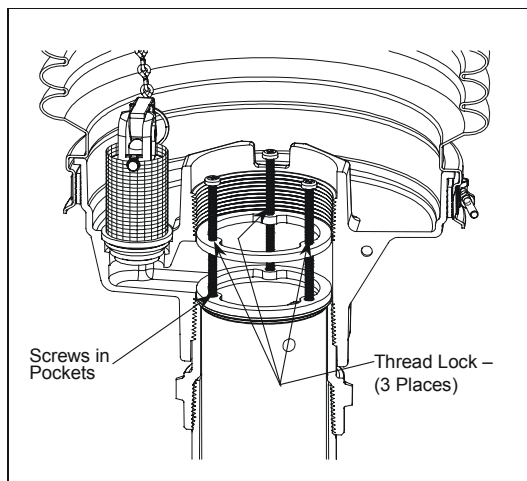


Figure 5

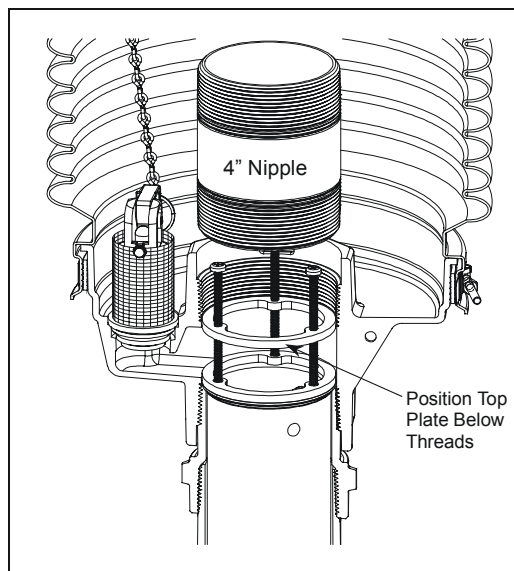


Figure 6

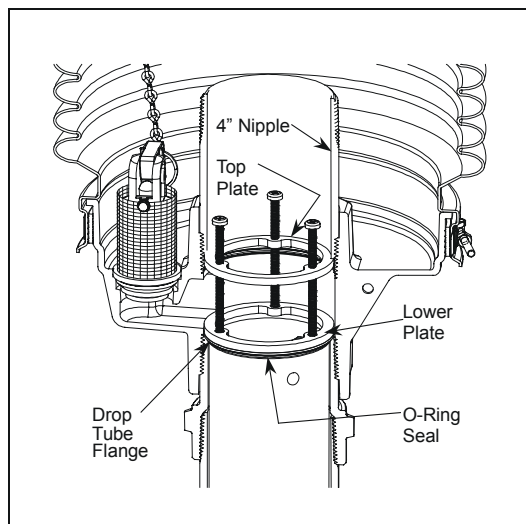


Figure 7

Step 9: (See figure 8)

Assembly of the Jack Screw Kit is now complete. Proceed to installation of the OPW 61SALP-EVR Rotatable Product Adaptor and OPW 634TT Cap in accordance with the OPW Installation Instructions supplied with the product.

Operation and Maintenance:

If a leak develops at the drop tube. Re-torque the (3) screws on the Jack Screw. (Torque value: 3.0 ft-lbs min. to 4.5 ft-lbs max.) If this does not correct the leak, check for burrs, clean the sealing surface on the FSA-400 and replace the o-ring on the drop tube.

NOTE: Loctite 242, thread locker, must be reapplied each time the screws are adjusted.

Important: Leave these instructions with Station Operator.

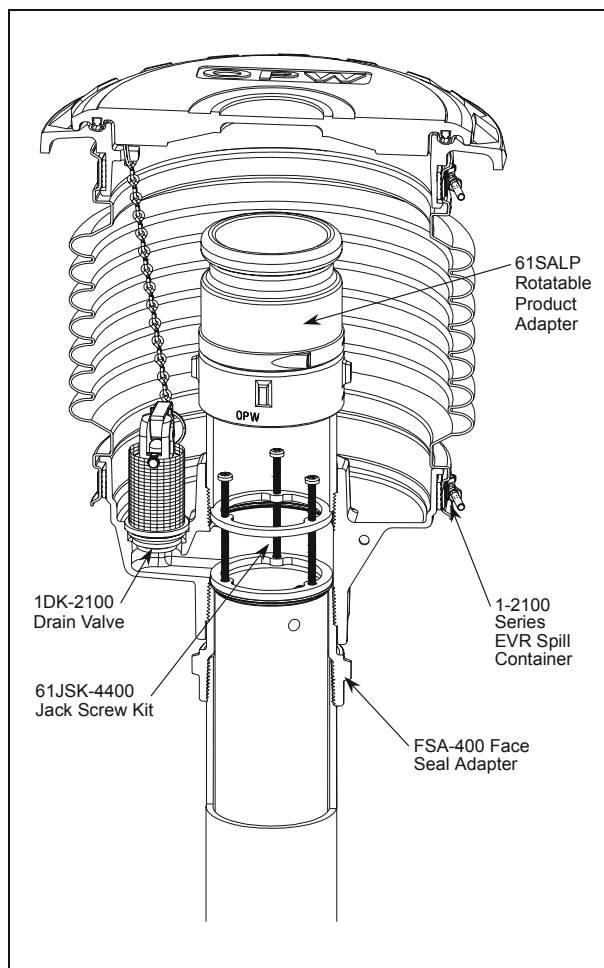


Figure 8



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Figure 2N



POMECO Installation and Maintenance Instructions 6111-1400 Tank Bottom Protector

IMPORTANT: Please read these warnings and use the assembly instructions completely and carefully before starting. Failure to do so may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

IMPORTANT: The POMECO Tank Bottom Protector is pre-assembled for your convenience and ease of installation. Check to make sure the unit is intact and undamaged and all parts have been supplied. Never substitute parts for those supplied. Doing so may cause product failure.

WARNING-DANGER: Using electrically operated equipment near gasoline or gasoline vapors may result in a fire or explosion, causing personal injury and property damage. Be sure that the working area is free from such hazards, and always use proper precautions.

NOTE: At all times when product is in the storage tank keep the riser pipe capped, so the vapors cannot escape into the environment.

Notice: OPW products must be used in compliance with applicable federal, state, and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials, and specification are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

Standard Product Warranty

OPW warrants that products sold by it are free from defects in materials and workmanship for a period of one year from the date of manufacture by OPW (ECO products two years from date of manufacture.) Proof of purchase may be required. As the exclusive remedy under this limited warranty, OPW, will at its sole discretion, repair, replace, or issue credit for future orders for any product that may prove defective within the one year date of manufacture period (repairs, replacements, or credits may be subject to prorated warranty for remainder of the original warranty period, complete proper warranty claim documentation required.) This warranty shall not apply to any product that has been altered in any way, which has been repaired by any party other than a service representative

authorized by OPW, or when failure is due to misuse, or improper installation or maintenance. OPW shall have no liability whatsoever for special, incidental or consequential damages to any party, and shall have no liability for the cost of labor, freight, excavation, clean up, downtime, removal, reinstallation, loss of profit, or any other cost or charges.

For any product certified to California 2001 standards, OPW warrants that product sold by it are free from defects in material and workmanship for a period of one year from date of manufacture or one year from date of registration of installation not to exceed 15 months from date of manufacture by OPW.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

Tank Bottom Protector:

The POMECO Tank Bottom Protector is designed to protect the Underground Storage Tank from damage due to the tank measuring stick being dropped into the tank to measure the fluid level.

POMECO Tank Bottom Installation Instruction

1. Check the distance from the bottom of the fill tube to the bottom of the tank. Verify that this distance is in conformance with manufacturer's recommendations and Local Codes. Remove the drop tube from the tank.
2. Using a # 11 Drill (0.191") - Drill a hole into the fill tube about 1/2" above and 1" to 1 1/16" over from point "A" (see figures 1 and 2). Keep in mind that the **POMECO Tank Bottom Protector** must rest on the bottom of the tank.
3. Insert the **POMECO Tank Bottom Protector** and line up the # 11 hole in the sliding rod guide with the corresponding hole just drilled in the drop tube. Make sure that point "A" is clear for future measurements of the drop tube's length. (See figure 2)
4. Attach the **POMECO Tank Bottom Protector** with the pop rivet supplied. Drill two more # 11 holes into the drop tube and sliding rod guide at the same time. Install supplied pop rivets into new holes.
5. Check to ensure that the **POMECO Tank Bottom Protector** slides up and down without binding.
6. Reinstall fill tube into the tank.

*Check local codes and regulation for proper dimension

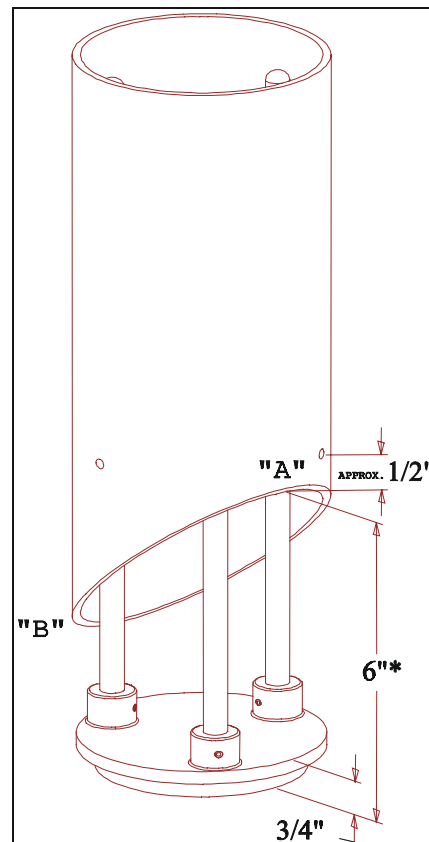


Figure 1

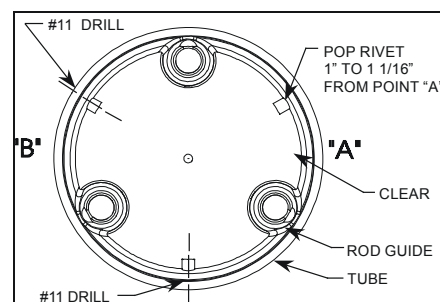


Figure 2

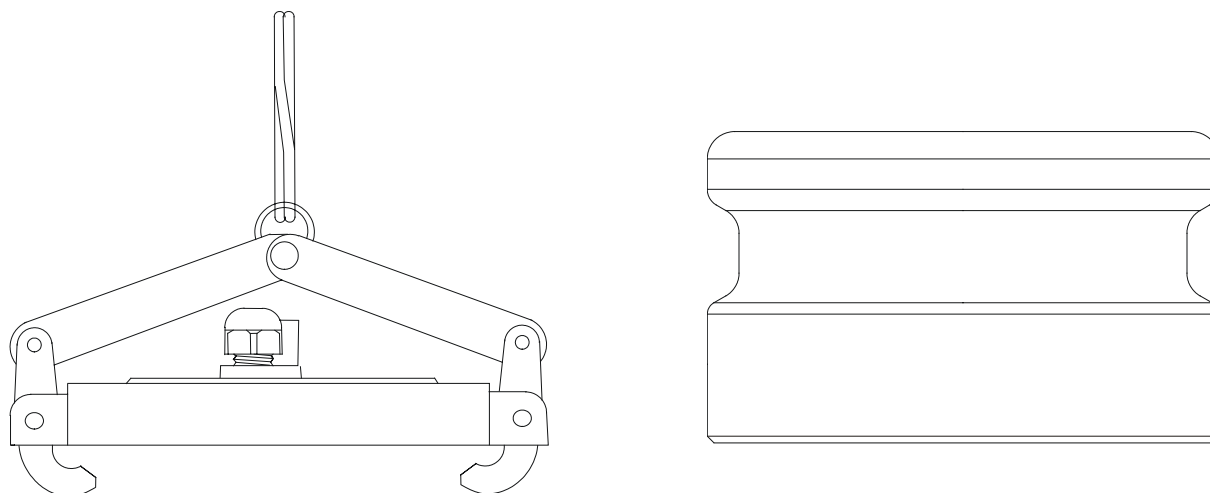


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Figure 20

Morrison Brothers 305XPA Series Tank Monitoring Cap and Ring Kit



305XP Series Cap

Installation Instructions –

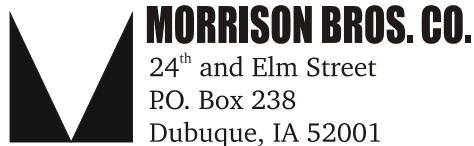
1. Apply a fuel resistant, non-hardening, anti-seize sealant (not adhesive) to cable connector threads. Follow manufacturer's instructions for installation of monitoring system.
2. Set cap on adapter
3. Push down on lever arms.

305 Series Adapter

Installation Instructions –

1. Apply a fuel resistant, non-hardening, anti-seize sealant (not adhesive) to body threads.
2. Thread body on to riser pipe. Torque to 23-26 ft.-lb.

Warranty- All Morrison products are thoroughly tested before shipment and only material found to be defective in manufacture will be replaced. Claims must be made within one year from date of invoice. Morrison Bros. Co. will not allow claims for labor of consequential damage resulting from purchase, installation, or misapplication for the product



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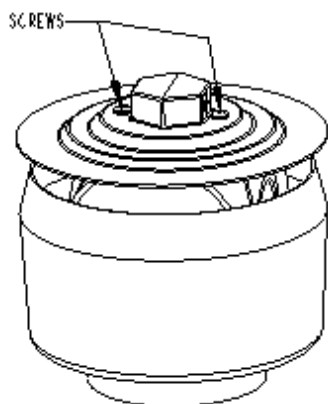
Figure 2P

Husky Model 4885 2-Inch Threaded Pressure/Vacuum Vent Valve

**PRESSURE/VACUUM VENT MODEL 4885
INSTALLATION AND MAINTENANCE
INSTRUCTIONS**

INSTALLATION

The P/V Vent is designed to fit on top of a 2" vent pipe. Remove the P/V Vent from the carton and visually inspect for any shipping damage.



Model 4885 Thread-On P/V Vent

Apply fuel resistant pipe sealant to the threads on the 2" vent stack. Screw the P/V Vent onto the vent stack and tighten to a range of 20 to 50 ft-lbs with a suitable wrench. DO NOT OVER-TIGHTEN. Periodic maintenance is recommended (see below).

MAINTENANCE

Annually inspect the P/V Vent valve for foreign objects without removing the P/V Vent valve from the vent pipe by using the following procedure:

1. Remove the screws that hold the top cover on.
2. Remove any debris that might be sitting inside the lower cover.
3. Check the drain holes in the lower cover for blockage.
4. The two (2) screens should not be removed.
5. Reinstall the top cover and retaining screws.
6. Tighten the screws firmly.

NOTE: DO NOT ALTER OR COVER THE P/V VENT



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**PRESSURE VACUUM VENT WARRANTY
INFORMATION**

Husky Corporation will, at its option, repair, replace, or credit the purchase price of any Husky manufactured Pressure Vacuum Vent which proves upon examination by Husky, to be defective in material and/or workmanship within EIGHTEEN (18) MONTHS from the date of shipment for any Husky Pressure Vacuum Vent, except as otherwise provided herein. For all other Husky manufactured product, see Husky Form No. PS2002-Term (4/15/02) at www.husky.com.

The warranty period on repaired or replacement product is only for the remainder of the warranty period. Buyer must return the products to Husky, transportation charges prepaid. This Warranty does not apply to equipment or parts which have been installed improperly, damaged by misuse, improper operation or maintenance, or which are altered or repaired in any way other than by Husky.

The Warranty provisions contained herein apply ONLY to original purchasers and subsequent commercial purchasers within the warranty period who use the equipment for commercial or industrial purposes. THERE ARE NO OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, AND ANY OTHER SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED.

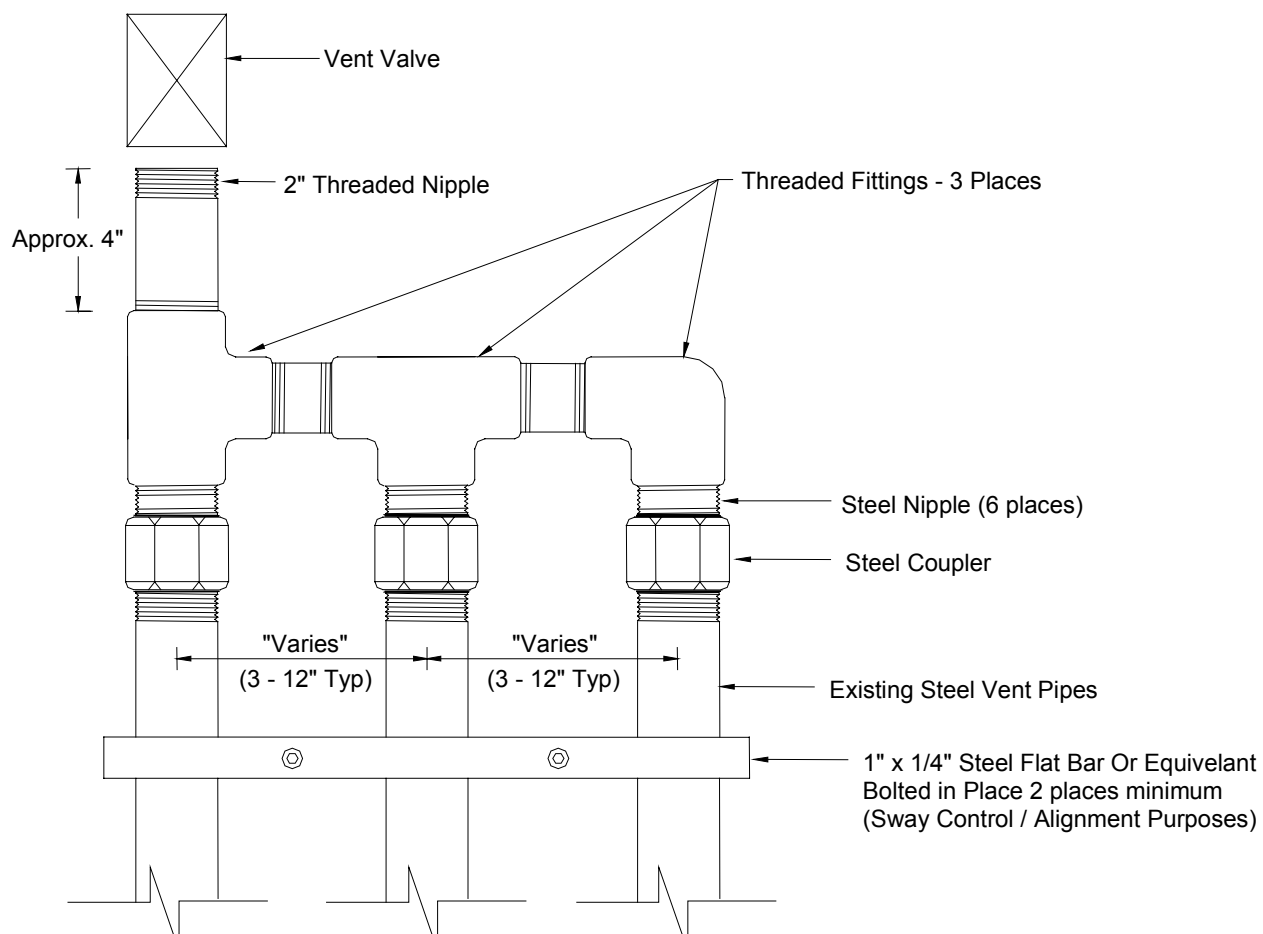
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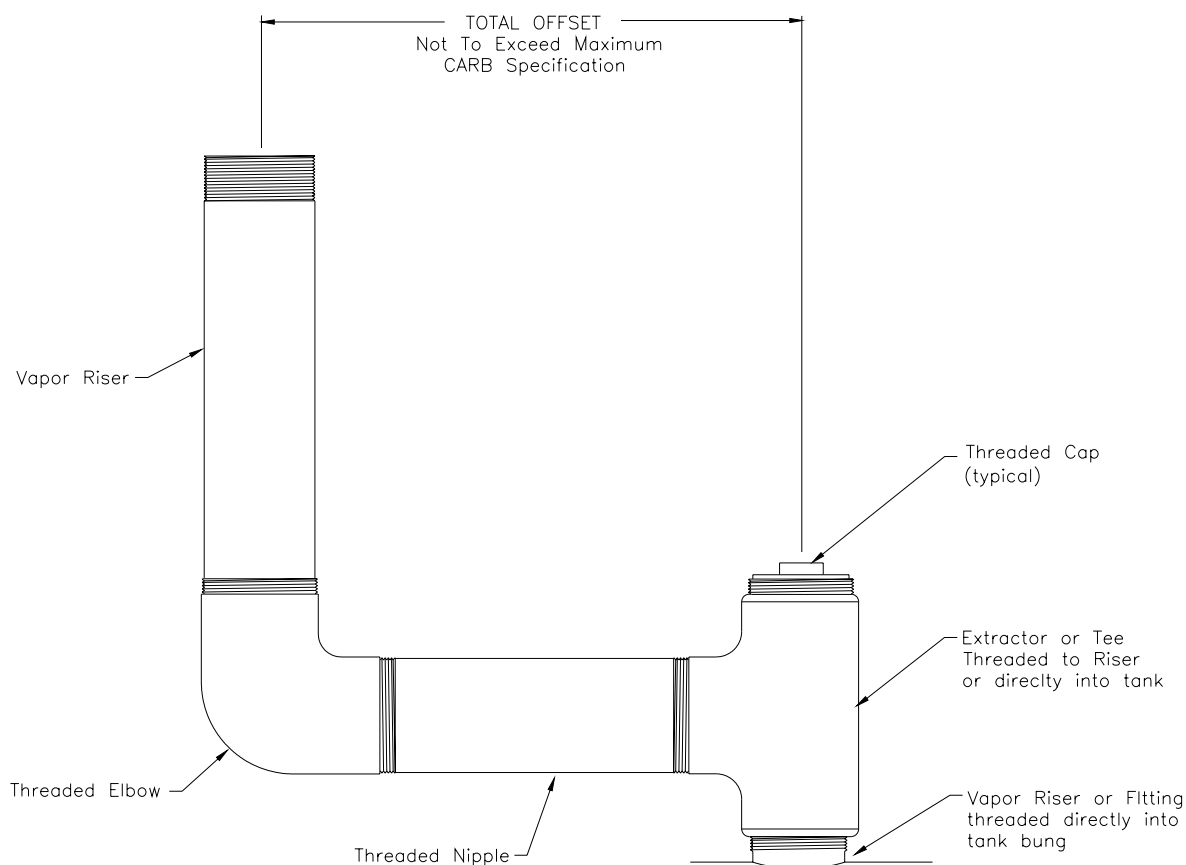
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Figure 2Q
Typical Vent Pipe Manifold



Note: This figure represents one instance where three vent pipes have been manifolded into one single outlet. A maximum number of Pressure/Vacuum Vent Valves, not exceeding an additive leakrate of 0.17 CFH at 2.00 inches H₂O, shall be used on any single GDF. For example, three valves with an identified leakrate of 0.05 CFH at 2.00 inches H₂O equate to an additive leak rate of 0.15 CFH. The leakrate of the valve shall be clearly identified by the manufacturer.

Figure 2Q
Typical Vapor Recovery Riser Offset



Note: This figure represents one instance where a vapor recovery riser has been offset in order to construct a two-point Phase I vapor recovery system. The above figure illustrates an offset using a 90-degree elbow. However, in some instances, elbows less than 90 degrees may be used. All fittings and pipe nipples shall be 4-inch diameter similar to those of the spill container and rotatable Phase I adaptors in order to reduce back pressure during a gasoline delivery.

Figure 2R

Example of a GDF Phase I Maintenance Log

Date	Component	Maintenance Performed	Test Company or Contractor	Telephone	Tester Name

Executive Order VR-102-A

Exhibit 3

Manufacturers Performance Standards and Specifications

The performance standards and specifications contained in this Exhibit shall establish the minimum requirements to which vapor recovery components shall be manufactured, warranted, and offered for sale. These specifications are the minimum parameters by which CARB shall determine compliance with certification.

Pressure/Vacuum Vent Valves for Storage Tank Vent Pipes

1. Each Pressure/Vacuum Vent Valve (P/V Valve) shall be 100 percent performance tested at the factory. Each P/V Valve shall be shipped with a card or label stating the performance specifications listed below, and a statement that the valve was tested to, and met, these specifications.
 - a. The pressure settings for the P/V Valve
 - Positive pressure setting of 3.0 ± 0.5 inches H₂O.
 - Negative pressure setting of 8.0 ± 2.0 inches H₂O.
 - b. The leak rate for each P/V Valve, including connections, shall not exceed:
 - 0.05 CFH at 2.0 inches H₂O.
 - 0.21 CFH at -4.0 inches H₂O.
2. Each P/V Valve shall have permanently affixed to it a yellow or gold label with black lettering listing the positive and negative pressure settings specified above.

Spill Container and Drain Valves

1. Spill Containers and all internal components contained within a Spill Container shall be compatible with any and all fuel blends in common use in California, including seasonal changes, and approved for use as specified in Title 13, CCR, section 2260, et seq.
2. Each Spill Container Drain Valve shall be 100 percent performance tested at the factory. Each Spill Container shall have affixed to it a card or label stating the performance specifications listed below, and a statement that the valve was tested to, and met, the following specification.
 - a. The maximum allowable leakrate shall not exceed 0.17 CFH at 2.00 inches H₂O

Drop Tube Overfill Prevention Device

1. Each Drop Tube Overfill Prevention Device shall be 100 percent performance tested at the factory. Each Drop Tube Overfill Prevention Device shall have affixed to it a card or label stating the performance specifications listed below, and a statement that the device was tested to, and met, the following specification.
 - a. The maximum allowable leakrate shall not exceed 0.17 CFH at 2.00 inches H₂O

Rotatable Product and Vapor Recovery Adaptors

1. The rotatable product and vapor recovery adaptors shall not leak.
2. Rotatable product and vapor recovery adaptors shall be capable of rotating at least 360 degrees when used in conjunction with any product or vapor recovery elbow used to connect to cargo tanks.
3. The vapor recovery adaptor cam and groove shall be manufactured in accordance with the standard described in Commercial Item Description, CID A-A-59326.
4. The product adaptor cam and groove shall be manufactured in accordance with the cam and groove standard specified by CARB as shown in Figure 3B.
5. Each product and vapor recovery adaptor shall be 100 percent performance tested at the factory. Each adaptor shall have affixed to it a card or label stating the performance specification listed below, and a statement that the adaptor was tested to, and met, the following specification.
 - a. The average static torque for the rotatable adaptor shall not exceed 108 pound-inch average static torque as determined in accordance with Static Torque of Rotatable Phase I Adaptors, Exhibit 4.

Product and Vapor Recovery Adaptor Dust Caps

1. Dust caps shall not leak when installed on vapor recovery or product adaptors. Dust caps shall be factory tested to ensure compatibility with the cam and groove standards for rotatable adaptors as specified in Section 3 of CP-201.

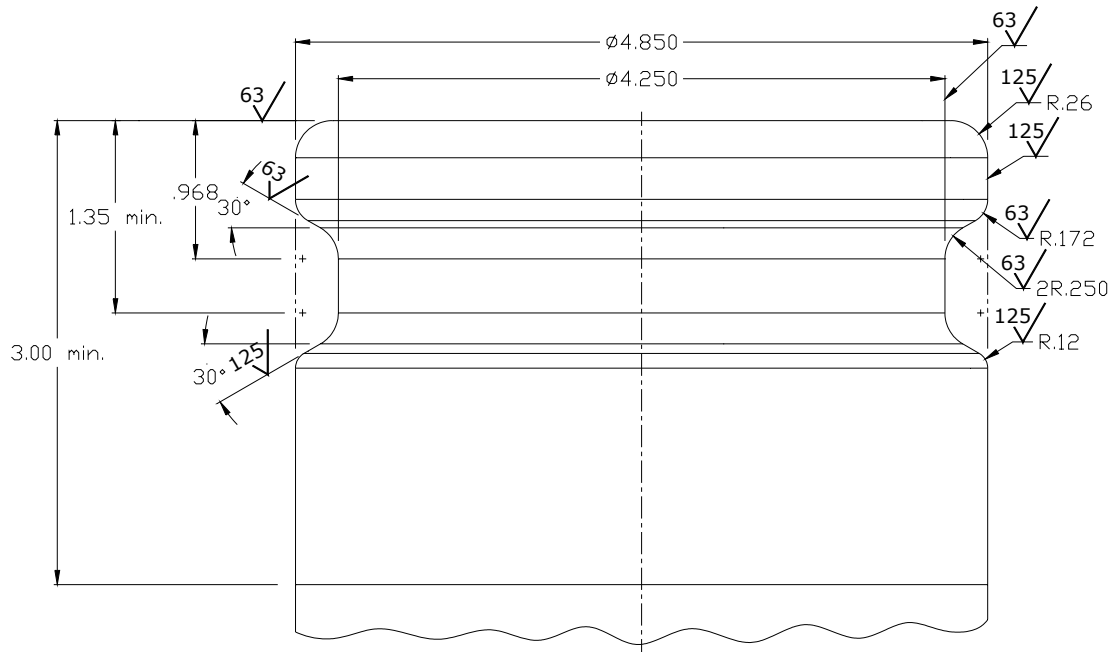
Figure 3A

Manufacturers Component Standards or Specifications

Component	Test Method	Standard or Specification
Rotatable Phase I Adaptors	Exhibit 4	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Overfill Prevention Device	Exhibit 5	≤ 0.17 CFH at 2.00 inches H ₂ O
Drain Valve Assembly	Exhibit 5	≤ 0.17 CFH at 2.00 inches H ₂ O
Rotatable Vapor Recovery Adaptor	Micrometer	Cam and Groove Standard CID A-A-59326
Rotatable Product Adaptor	Micrometer	Cam and Groove Standard CARB Standard (Figure 3B)
UST, Fittings and Connections	TP-201.3	2.00 inches H ₂ O - 5 minutes
Pressure/Vacuum Vent Valve	Exhibit 6	Positive Pressure: 3.0 ± 0.5 inches H ₂ O Negative Pressure: 8.0 ± 2.0 inches H ₂ O Leakrate: ≤ 0.05 CFH at +2.0 inches H ₂ O ≤ 0.21 CFH at -4.0 inches H ₂ O

Figure 3B

CARB Product Adaptor Cam and Groove Standard



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON DECIMALS
.XXX ± .005
.XX ± .01
ANGLES ± 0.5°

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Exhibit 4

Static Torque of Rotatable Phase I Adaptors

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer, or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

The purpose of this procedure is to quantify the amount of breaking torque required to start the movement of a rotatable Phase I adaptor. This procedure determines compliance with the performance specification required by CARB.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

A compatible dust cap is installed on a rotatable Phase I adaptor. A Torque Test Tool is installed on the dust cap and three static torque measurements are taken. If the resulting average static torque is less than, or equal to, the maximum allowable value specified in Certification Procedure CP-201, the adaptor is verified to be in compliance.

3. BIASES AND INTERFERENCES

- 3.1** Missing or defective gaskets in the dust cap may bias the results towards compliance as a dust cap may slip on the rotatable adaptor prior to the adaptor rotating. This bias is eliminated by ensuring that the dust cap seal is securely in place and does not show signs of excessive wear or damage.
- 3.2** Gasoline or other lubricants on the sealing surface of the rotatable adaptor or the dust cap seal can cause the dust cap to slip and may bias the results towards compliance. This bias is eliminated by ensuring that the sealing surface of the rotatable adaptor and dust cap is clean, dry and free of lubricants.

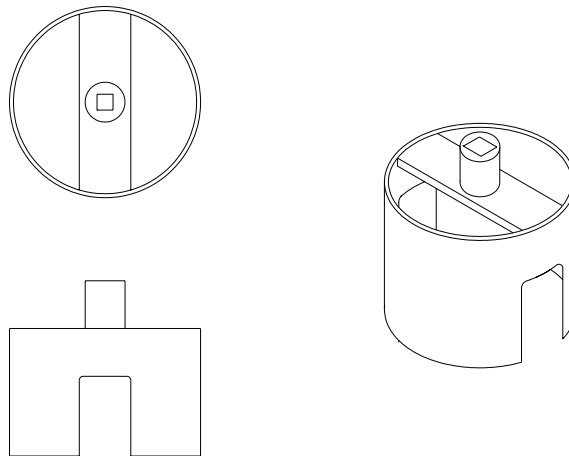
4. SENSITIVITY, RANGE, AND PRECISION

- 4.1** Torque Wrench. The maximum full-scale range shall be 250 pounds-inches with minimum accuracy of 3.0 percent full-scale and minimum readability of 5 pound-inch increments. The torque wrench shall incorporate a mechanism, such as a tell-tale needle, that identifies the maximum applied torque during each measurement.

5. EQUIPMENT

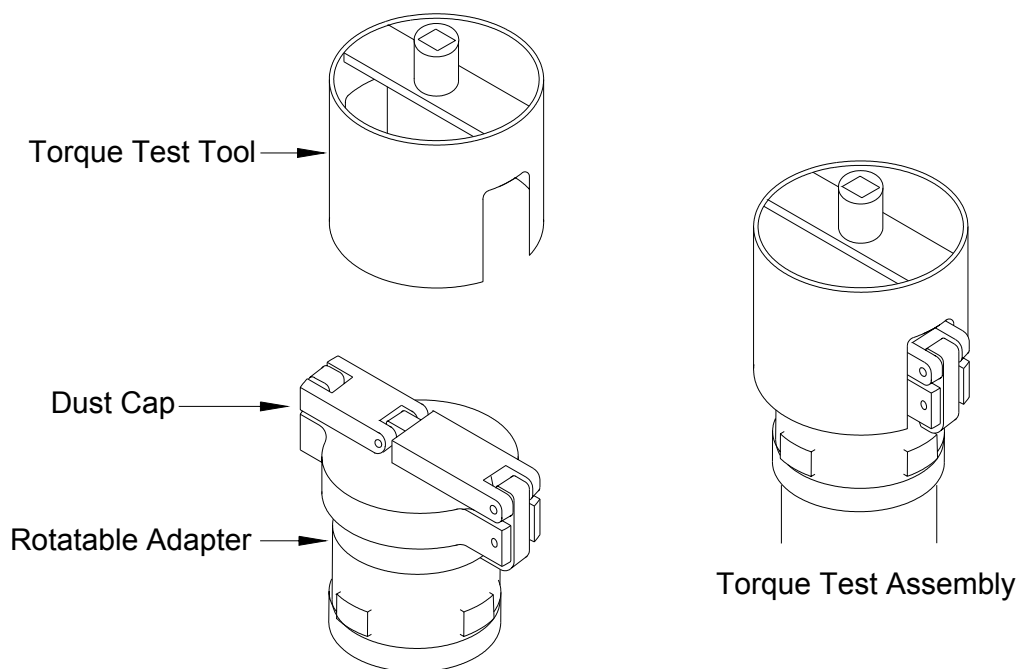
- 5.1 Torque Wrench. Use a Snap-On Model TER12FUA Torque Wrench, or equivalent to measure the static torque of the rotatable adaptor.
- 5.2 Static Torque Test Assembly. Use a compatible dust cap and rotatable adaptor Torque Test Tool, Phil-Tite® Part Number 6004 or equivalent. A depiction is shown in Figure 1. An example of a Static Torque Test Assembly is shown in Figure 2.

Figure 1
Phil-Tite® Torque Test Tool



- 5.3 Socket wrench and socket extension. Use a 3/8 inch or 1/2 inch socket wrench, adaptors and socket extension (if needed) to verify 360-degree rotation or to conduct static torque testing. The socket extension shall not exceed 12 inches in length.
- 5.4 Traffic Cones. Use traffic cones to encircle the Phase I area while the test is being conducted.

Figure 2
Static Torque Test Assembly



6. PRE-TEST PROCEDURES

- 6.1** Place the traffic cones around the perimeter of the Phase I spill containers, allowing sufficient space to safely conduct the test.
- 6.2** Remove the lids of the Phase I spill containers. Visually determine that the adaptors are of the rotatable design.
- 6.3** Inspect the dust caps to ensure that the caps and that the gaskets are intact and do not show signs of excessive wear or damage.
- 6.4** Inspect the rotatable adaptors. If the adaptors are wet or covered with a lubricant, wipe the adaptors clean to ensure maximum friction between the dust cap and the adaptor seal surface.

7. TEST PROCEDURE

- 7.1** Install the dust cap on the Phase I rotatable adaptor.
- 7.2** Install the Torque Test Tool on the dust cap as shown in Figure 2.
- 7.3** Verification of rotation, conducted prior to the static torque test. Place a socket wrench with socket extension (if required) into the Torque Test Tool, or equivalent. Rotate the adaptor a minimum of 360 degrees. Do not continue with static torque measurements if the adaptor does not rotate 360 degrees. Record the result on the data sheet where provided.
- 7.4** Install the Torque Wrench into the Torque Test Tool. If the spill container is too deep to allow connection of the Torque Wrench, use a compatible socket extension to reach into the bucket to the Torque Test Tool. The socket extension shall not exceed 12 inches in length.
- 7.5** Place one hand on top of the Torque Wrench, directly above the center of the Torque Test Tool to keep the wrench level while applying pressure. Gently apply an even, steady pressure just until the adaptor begins to rotate. Record the maximum static torque value shown on the torque wrench and proceed to 7.6.
- 7.6** After the first measurement, slowly rotate the adaptor one third of full rotation (120 degrees) from the point that the first measurement was taken. Using the same technique as described in 7.5, measure and record the second torque measurement.
- 7.7** Following the first two measurements, slowly rotate the another one third of full rotation (120 degrees) from the second measurement location. Using the same technique as specified in 7.5, measure and record the third torque measurement. Rotating the adaptor in one-third increments ensures that the average static torque is representative of the entire adaptor rotation.

8. POST-TEST PROCEDURES

- 8.1** Remove the Torque Test Assembly and replace the appropriate lids on each of the spill containers.
- 8.2** Remove the traffic cones from the Phase I area.

9. CALCULATING RESULTS

- 9.1** Calculate the arithmetic average of the three tests for each adaptor tested and record the average for each adaptor on the data sheet where provided.

10. REPORTING RESULTS

- 10.1** Report the results of the static torque measurements on the data sheet where provided. Districts may require the use of alternate data sheets provided they include the same parameters identified on Form 1.

11. ALTERNATE PROCEDURES

- 11.1** This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

Form 1
Static Torque of Rotatable Phase I Adaptors

Test Company:	Conducted By:
Test Date:	Facility Name:
Facility Address:	City:

Measurement Units: pound-inches

Vapor Adaptor 1			Vapor Adaptor 2			Vapor Adaptor 3			Vapor Adaptor 4		
360° Test	PASS	FAIL	360° Test	PASS	FAIL	360° Test	PASS	FAIL	360° Test	PASS	FAIL
Brand:			Brand:			Brand:			Brand:		
Model:			Model:			Model:			Model:		
Grade:			Grade:			Grade:			Grade:		
Torque 1:			Torque 1:			Torque 1:			Torque 1:		
Torque 2:			Torque 2:			Torque 2:			Torque 2:		
Torque 3:			Torque 3:			Torque 3:			Torque 3:		
Average:			Average:			Average:			Average:		

Product Adaptor 1			Product Adaptor 2			Product Adaptor 3			Product Adaptor 4		
360° Test	PASS	FAIL	360° Test	PASS	FAIL	360° Test	PASS	FAIL	360° Test	PASS	FAIL
Brand:			Brand:			Brand:			Brand:		
Model:			Model:			Model:			Model:		
Grade:			Grade:			Grade:			Grade:		
Torque 1:			Torque 1:			Torque 1:			Torque 1:		
Torque 2:			Torque 2:			Torque 2:			Torque 2:		
Torque 3:			Torque 3:			Torque 3:			Torque 3:		
Average:			Average:			Average:			Average:		

Comments: _____

Executive Order VR-102-A

Exhibit 5

Leak Rate of Drop Tube Overfill Prevention Device

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "CARB" refers to the State of California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer, or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

The purpose of this procedure is to quantify the pressure integrity of a Drop Tube Overfill Prevention Device installed in a Phase I drop tube on two-point Phase I systems. When applicable, this procedure shall also be used to quantify the leak rate of a Spill Container Drain Valve when the drain valve exits liquid directly into the drop tube.

This procedure is applicable only to those gasoline dispensing facilities (GDF) equipped with a Drop Tube Overfill Prevention Device. This procedure is used during certification and in the determination of compliance with the performance specification for the maximum allowable leakrate as defined in the Certification Procedure 201 (CP-201).

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

A cap, compatible for use on a Phase I product adaptor is modified to allow the installation of a flow meter and pressure gauge. Nitrogen flow is then introduced and pressure measured. If the resulting, one-minute final pressure is greater than or equal to 2.00 inches H₂O at the specified flow rate, the device is verified to be in compliance.

In the case where both a Drop Tube Overfill Prevention Device and Drop Tube/Drain Valve Assembly are installed, each device shall be tested individually in order to verify compliance of each component. In this instance, the components shall be isolated from each other with use of an inflatable plumber's bladder.

3. BIASES AND INTERFERENCES

3.1 Missing or defective gaskets on the Phase I product adaptor, or a loose adaptor, may bias the results towards non-compliance. This bias is eliminated by testing the Phase I product adaptor for leaks prior to final determination of the compliance status of the Overfill Prevention Device.

3.2 Refueling during the test may bias the results. No vehicle refueling or bulk deliveries to adjacent tanks at the facility shall occur during testing.

- 3.3** Product levels less than four (4) inches above the highest opening at the bottom of the submerged drop tube may bias the test toward noncompliance.
- 3.4** Positive gauge pressure in the storage tank headspace may bias the results towards compliance. Ensure that the storage tank does not contain positive pressure with use of a Pressure Relief Adaptor and pressure gauge as described in Section 5.
- 3.5** Liquid levels in the drop tube above the location of the overfill protection device will bias the results toward compliance. Ensure that the liquid level is below the level of the Overfill Prevention Device.
- 3.6** Leaks in the test equipment will bias the results toward non-compliance. Prior to testing conduct a leak check of the test equipment. Leak detection solution may also be used during the test to verify the absence of leaks in the test equipment.
- 3.7** Use of this procedure to quantify the leak rate of Spill Container drain valves that drains liquid into the ullage space of the storage tank instead of directly into the drop will yield invalid results. Ensure that the drain valve exits directly into the drop tube prior to establishing the proper flow rate.

4. SENSITIVITY, RANGE, AND PRECISION

- 4.1** Flow Metering Device (i.e., Rotameters). Minimum sensitivity shall be 15 ml/min (.005 CFH) with a maximum full-scale range of 300 ml/min and minimum accuracy of ± 5 percent. The device scale shall be a minimum of 150mm (5.91 inches) tall to provide a sufficient number of graduations for accurate readability.
- 4.2** Mechanical Pressure Gauge. Maximum full-scale range shall be 5.00 inches H₂O with minimum accuracy of ± 2.0 percent of full-scale. The minimum sensitivity of 0.01 inches H₂O. The diameter of the pressure gauge face shall be 4 inches.
- 4.3** Electronic Pressure Gauge. Sensitivity shall be 0.01 inches H₂O with a maximum full-scale range of 20 inches H₂O and minimum accuracy of ± 2 percent full-scale.

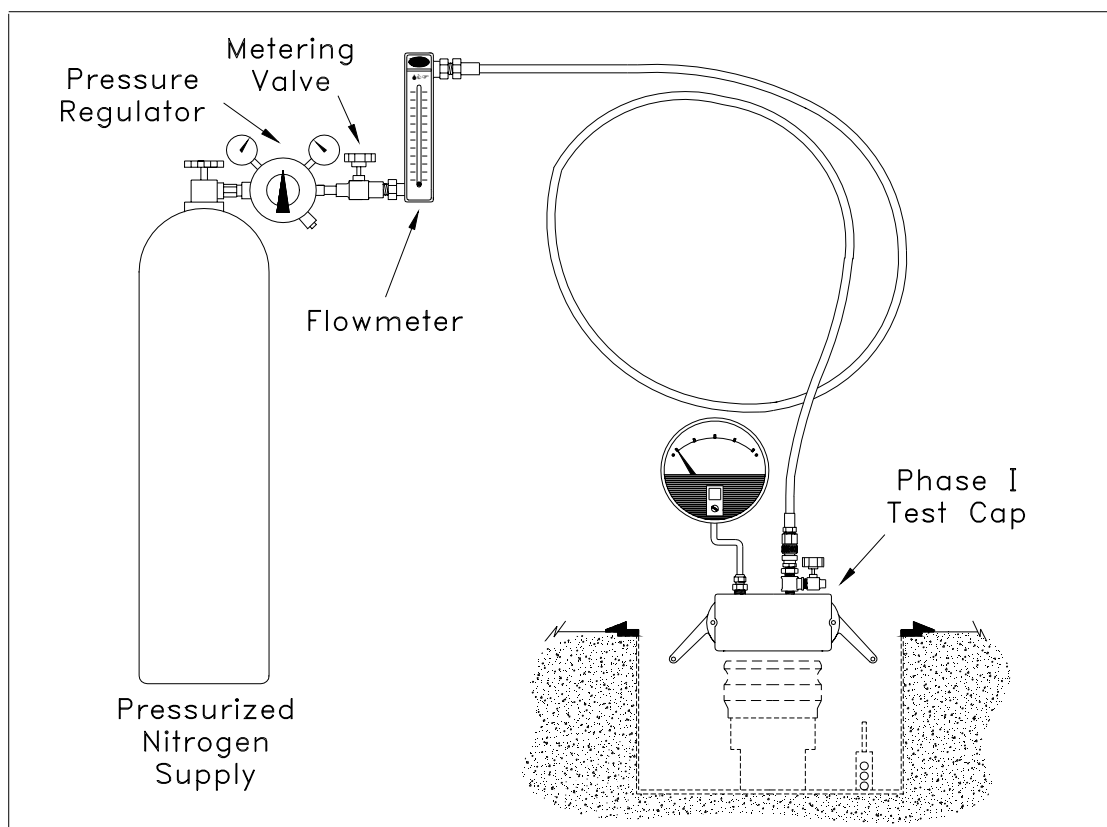
5. EQUIPMENT

- 5.1** Drop Tube Test Assembly and Cap. Use a product dust cap or Cam LockTM fitting compatible with the Phase I product adaptor. The cap shall be equipped with a minimum of two pressure taps in which to connect a pressure gauge and flowmeter. An example of a Drop Tube Test Assembly is shown in Figure 1. An example of a Drop Tube Test Cap is shown in Figure 2.
- 5.2** Flow Meter (Rotameter). Use an Aalborg Flow Meter, tube number 032-41C or equivalent with minimum specifications in Section 4 to measure or introduce flow.
- 5.3** Pressure Gauge. Use a Dwyer Model 475 Mark III Series electronic pressure gauge or equivalent, to measure the pressure inside of the drop tube. If a mechanical pressure gauge is desired, use a Magnahelic Model 2000-0 or equivalent that

conforms to the minimum specifications listed in section 4 to measure the pressure inside of the drop tube during testing.

- 5.4 Pressure Relief Adaptor.** Use a compatible vapor recovery elbow of modified vapor recovery dust cap to depress the vapor recovery poppet and relieve any positive headspace pressure in the underground tank. Rags, screwdrivers or other devices not intended to mate with the vapor recovery adaptor cam and groove shall not be used to depress the vapor recovery poppet.

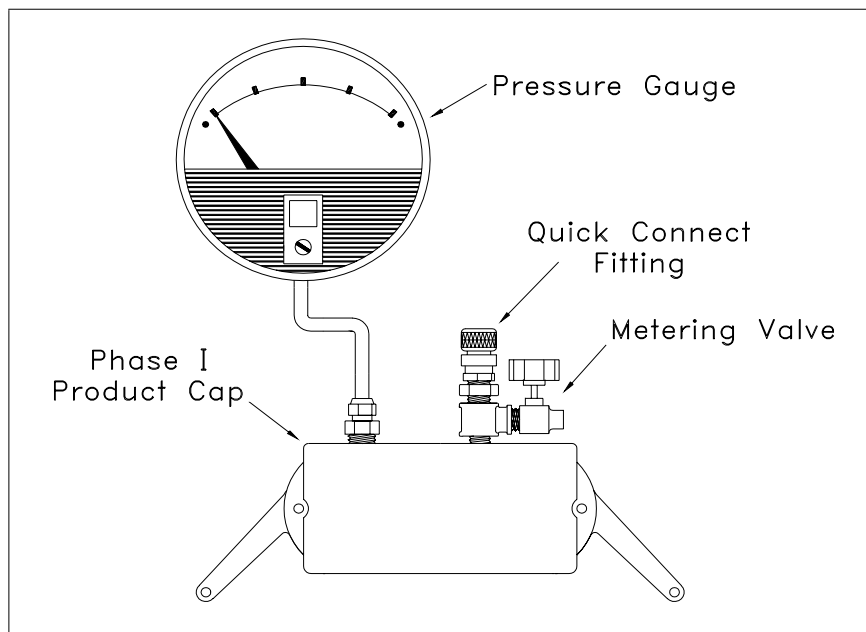
Figure 1
Drop Tube Test Assembly



- 5.5 Nitrogen.** Use commercial grade gaseous nitrogen in a high-pressure cylinder, equipped with a single-stage pressure regulator and one psig pressure relief valve.
- 5.6 Stopwatch.** Use a stopwatch accurate to within 0.10 seconds to time the pressurizing of the drop tube and the one minute flow stabilization.
- 5.7 Leak Detection Solution.** Any commercial liquid solution designed to detect vapor leaks may be used to verify that no leaks are present in the Drop Tube Test Assembly.

- 5.8 Inflatable Plumber's Bladder. Use a "three-four" (3-4) inflatable plumber's bladder and extension hose equipped with a safety chain as shown in Figure 3 to isolate the drain valve from the Overfill Prevention Device when applicable. The safety ring must be removable, allowing the tester place a Drop Tube Test Cap on the product adaptor following inflation.
- 5.9 Traffic Cones or Caution Tape. Use traffic cones or caution tape to encircle the area containing the Phase I manholes while the test is being conducted.
- 5.10 Tank Gauging Stick. Use a tank gauging stick to verify that the liquid level is at least four (4) inches above the highest opening at the bottom of the submerged drop tube. The tank gauging stick shall be equipped with a non-sparking "L" bracket at the end.

Figure 2
Drop Tube Test Cap



6. PRE-TEST PROCEDURES

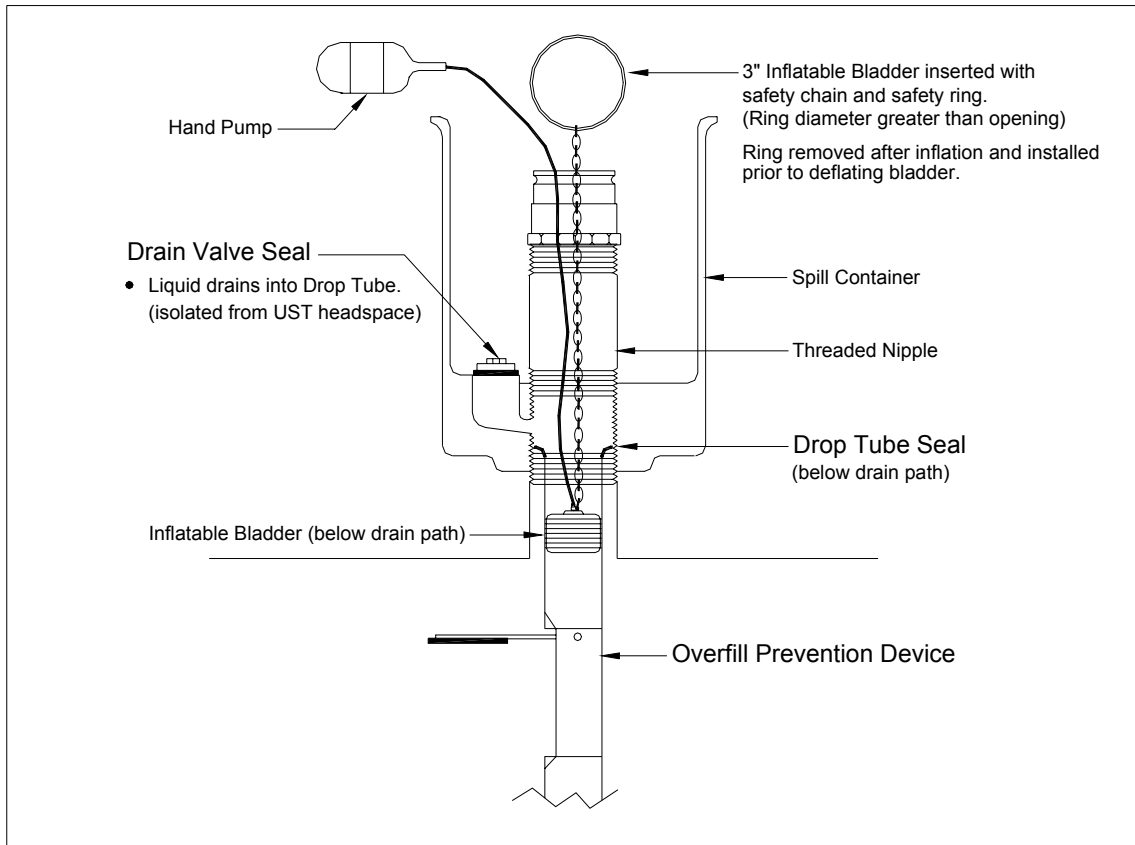
- 6.1 The flow meter and pressure gauge shall be calibrated within 180 days prior to conducting testing. The flow meter shall be calibrated for use with nitrogen. Calibrations shall be conducted in accordance with **CARB calibration methodology for flow meters, Appendix D of Air Monitoring Quality Assurance, Volume VI, Standard Operating Procedures for Stationary Source Emission Monitoring and Testing, January 1979.**
- 6.2 All pressure measuring device(s) shall be bench calibrated using a reference gauge, incline manometer or NIST traceable standard at least once every six (6) months.

Calibration shall be performed at 20, 50, and 80 percent of full scale. Accuracy shall be within five (5) percent of each of these calibration points.

- 6.2 Place the traffic cones or caution tape around the perimeter of the Phase I containment boxes, allowing sufficient space to safely conduct the test.
- 6.3 Remove the lids of the Phase I containment boxes. Visually determine that the drop tube is equipped with an Overfill Prevention Device.
- 6.4 Inspect the Phase I product adaptor to ensure that the gasket is intact and that the adaptor is properly tightened to the Spill Container riser.
- 6.5 Verify that the liquid level in the storage tank is at least four (4) inches above the highest opening at the bottom of the submerged drop tube using the tank gauging stick.
- 6.6 Inspect the drain valve configuration. Determine whether the drain valve drains liquid directly into the drop as shown in Figure 3. Verification of both the Drop Tube Overfill Prevention Device and Drain Valve configuration is required in order to determine the test method.

Figure 3

Inflatable Bladder Installation and Depiction of Components



7. TEST PROCEDURE

- 7.1** If the drain valve from Section 6.6 exits liquid directly into the drop tube, carefully install the inflatable plumber's bladder ("3 - 4 model") into the drop tube below the drain valve and above the overfill prevention device and inflate. Once inflated, carefully remove the safety ring, allowing the chain to rest on top of the bladder. If the drain valve does not exit liquid directly into the drop tube, proceed to 7.2.
- 7.2** Connect the Drop Tube Test Cap to the Phase I product adaptor as shown above in Figure 1. Connect the nitrogen supply line to the inlet of the flow meter.
- 7.3** With no vehicle refueling, open the nitrogen supply and adjust the nitrogen flow rate to 0.42 CFH (200 ml/min) and proceed to 7.3.
- 7.4** Start the stopwatch for a maximum of 5 minutes or until the pressure gauge reads 2.10 inches H₂O. Record the pressurization time on the data sheet and proceed accordingly as follows:
 - 7.4.1** If the pressure did not reach 2.10 in. H₂O within 5 minutes, the device does not comply with the maximum allowable leak rate.
 - 7.4.2** If the pressure reached 2.10 inches H₂O within 5 minutes reduce the nitrogen feed to the maximum allowable leak rate listed in CP-201 for the device and observe the pressure gauge for 1-minute. If the 1-minute final pressure is less than 2.00 inches H₂O the device does not comply with the maximum allowable leak rate.
- 7.5** Record the one-minute final pressure on the data sheet.
- 7.6** If preliminary testing was conducted for a Drop Tube/Drain Valve Assembly, carefully remove the inflatable plumbers bladder installed in 7.1 using the safety ring and re-conduct this procedure pursuant to sections 7.2 through 7.5 for the Drop Tube Overfill Prevention Device.

8. POST-TEST PROCEDURES

- 8.1** Carefully remove the Drop Tube Test Cap from the Phase I adaptor. Store all test equipment in a protected, safe location to prevent damage to the instruments.
- 8.2** Reinstall the safety ring and deflate the inflatable plumber bladder, if used.
- 8.3** Replace the caps on the appropriate Phase I adaptors, and the appropriate lids on the Spill Containers.
- 8.4** Remove the traffic cones from the Phase I area.
- 8.5** If the steady-state pressure was not equal to 2.00 inches H₂O and the flow meter could not quantify the flow rate of the leak, Equation 9-1 may be used to determine the leakrate at 2.00 inches H₂O.

9. CALCULATING RESULTS

9.1 If the flow rate of nitrogen was at the upper limit of the flow meter and the measured pressure never reached 2.00 inches H₂O, but was greater than 0.0 inches H₂O, the actual leak rate at a pressure of 2.00 inches H₂O shall be calculated as follows:

$$Q_{2.00} = (2.00)^{1/2} \left[\frac{Q_{actual}}{(P_{actual})^{1/2}} \right] \quad \text{Equation 9 - 1}$$

Where:

$Q_{2.00}$ = Leak rate at 2.00 inches H₂O, cubic feet per hour (CFH)
 Q_{actual} = Actual introduction rate of nitrogen, cubic feet per hour (CFH)
 P_{actual} = Actual measured steady-state pressure at Q_{actual} , inches H₂O
2.00 = Pressure, inches H₂O

10. REPORTING RESULTS

Report the results of the quantification of leak rate on Form 1. Districts may require the use of alternate Forms provided they include the same parameters identified on Form 1.

11. ALTERNATE PROCEDURES

This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

Form 1

Drop Tube Overfill Prevention Device and Drop Tube/Drain Valve Assembly Data Sheet

Facility:	Test Date:	Tester(s):
Address:	City:	Zip Code:
Overfill Prevention Make & Model:	Spill Container Make & Model:	
Date of Last Flowmeter Calibration:	Date of Last Pressure Device Calibration:	

Test Results

Product Grade	Time Required to Pressurize to 2.10 in. H ₂ O (seconds)	Pressurization Flow Rate (CFH) (both devices)	Device:		Device:	
			1-Minute Final Pressure (in. H ₂ O)	Flow Rate (CFH)	1-Minute Final Pressure (in. H ₂ O)	Flow Rate (CFH)

<i>Comments:</i>

Executive Order VR-102-A

Exhibit 6

Leak Rate and Cracking Pressure of Pressure/Vacuum Relief Vent Valves

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "CARB" refers to the State of California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

The purpose of this procedure is to determine the pressure and vacuum at which a Pressure-Vacuum Vent Valve (PV Valve) actuates, and to determine the volumetric leak rate at a given pressure as specified by Certification Procedure 201 (CP-201). This procedure is applicable for certification and compliance testing of PV Valves.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

The volumetric leak rate of a PV Valve is determined by measuring the positive and negative flow rates at corresponding pressures. This is accomplished by using a flow metering device to introduce a known flow into a test stand while measuring pressure.

3. BIASES AND INTERFERENCES

3.1 Installing a PV Valve onto the test stand in a manner that is not in accordance with the manufacturer's recommended installation instructions can produce erroneous results.

3.2 Leaks in the test stand or test equipment can produce erroneous results.

4. SENSITIVITY, RANGE, AND PRECISION

4.1 Electronic Pressure Measuring Device. Sensitivity shall be 0.01 inches H₂O with a maximum full-scale range of 20 inches H₂O and minimum accuracy of 0.50 percent.

4.2 Electronic Flow Metering Device. Minimum sensitivity shall be 1.0 ml/min with a maximum full-scale range of 200 ml/min and minimum accuracy of ± 1.0 percent of full-scale.

4.3 Flow Metering Device (i.e., Rotameters). Minimum sensitivity shall be 15 ml/min (.005 CFH) with a maximum full-scale range of 300 ml/min and minimum accuracy of ± 5 percent. The device scale shall be a minimum of 150mm (5.91 inches) tall to provide a sufficient number of graduations for accurate readability.

5. EQUIPMENT

- 5.1** Nitrogen. Use commercial grade gaseous nitrogen in a high-pressure cylinder equipped with a pressure regulator and one (1.00) psig pressure relief valve. As an alternative, compressed air may be used to pressurize to the minimum working pressure required by the Flow Metering device.
- 5.2** Ballast Tank. If required, use a commercially available air tank (2 gallon minimum), capable of being pressurized or evacuated (placed under vacuum) to the minimum working pressure required by the flow-metering device(s).
- 5.3** Vacuum Pump or Vacuum Generating Device. Use a commercially available vacuum pump or equivalent, capable of evacuating the steel ballast tank or test stand to the minimum working pressure required by the flow-metering device.
- 5.4** Electronic Pressure Gauge. Use a Dwyer Model 475 Mark III Series or equivalent, electronic pressure gauge that conforms to the minimum requirements listed in section 4 to measure the pressure inside of the test stand.
- 5.5** Flow Metering Device(s). Use either an electronic flow-metering device or Rotameter as described below to measure or introduce a volumetric flow rate. Although the use of either type of instrument is allowed, electronic flow metering devices provide higher accuracy and precision. For the purpose of certification testing, only electronic flow metering devices shall be used.
 - 5.5.1** Electronic Flow Metering Device. Use a Mass Flow Meter, Aalborg GFM-05 or equivalent that conforms to the minimum requirements listed in section 4 to introduce nitrogen or compressed air into the test stand. The Mass Flow Meter shall be equipped with a high precision needle valve to accurately adjust the flow settings. The meter may be used for both positive and negative flow rates by reconfiguring the pressure or vacuum lines.
 - 5.5.2** Rotameters. Two (2) devices required. Use two Aalborg Flow Meters, tube number 032-41C, or equivalent with minimum specifications in Section 4 to measure or introduce flow rates. One meter shall use a needle valve oriented for introducing positive flow and the other using an inverted needle valve for introducing vacuum.
- 5.6** Test Stand. Use a test stand as shown in Figure 1 or equivalent, equipped with a 2-inch NPT threaded pipe on at least one end for attaching the PV Valve in an upright position. The test stand shall be equipped with at least two (2) ports used for introducing flow and measuring pressure. Test stands may be constructed of various materials or dimensions.

6. PRE-TEST PROCEDURES

- 6.1** All pressure measuring device(s) shall be bench calibrated using a reference gauge, incline manometer or NIST traceable standard at least once every six (6) months.

Calibration shall be performed at 20, 50, and 80 percent of full scale. Accuracy shall be within five (5) percent at each of these calibration points.

- 6.2** Electronic pressure measuring devices shall be calibrated immediately prior to testing using the zero gauge pressure adjustment knob located on the instrument.
- 6.3** The Flow Metering device(s) shall be calibrated using a reference meter or NIST traceable standard. Calibrations shall be performed at 20, 50, and 80 percent of full-scale range and shall take place at a minimum of once every six (6) months.
- 6.4** Leak check the test stand prior to installing the PV Valve.
 - (a) Install a 2-inch cap onto the NPT threads in place of the PV Valve using pipe sealant or Teflon tape.
 - (b) Check all fittings for tightness and proper assembly.
 - (c) Slowly establish a stable gauge pressure in the test stand between 18.00 and 20.00 inches water column and allow pressure to stabilize.
 - (d) Check for leaks by applying a leak detection solution around all fittings and joints and by observing the pressure for pressure changes that may identify a leak.
 - (e) If soap bubbles form or the test stand pressure will not stabilize, repeat (a) through (d); it may be necessary to place the test apparatus in an environment that is free from the effects of wind or sunlight.

TEST PROCEDURE

- 7.1** Install the PV Valve on the test stand in an upright position following the installation instructions provided by the manufacturer. Incorrectly installing the valve on the test stand will invalidate any pressure versus flow rate measurement.
- 7.2** Two-inch Leak Rate. Slowly open the control valve on the Positive Flow Metering device until the pressure in the test stand stabilizes at positive two (2.00) inches H₂O. Maintain steady state pressure at 2.00 inches H₂O by using the control valve for at least thirty (30) seconds. Steady state flow is indicated by a pressure change of no more than 0.05 inches H₂O on the pressure gauge. Record the final flow rate on the data sheet and close the control valve.
- 7.3** Positive Cracking Pressure. Open the control valve on the Positive Flow Metering device to establish a flow rate of 120 ml/min. Observe the test stand pressure. The PV Valve should “crack” at a pressure of approximately 3.00 inches H₂O. This is marked by a sudden drop in pressure or at which pressure stabilizes. Allow the PV Valve to continue cracking for at least thirty (30) seconds while maintaining the flow rate. Record the final pressure on the data sheet and close the control valve.
- 7.4** Negative Four-inch Leak Rate. Open the control valve on the Negative Flow Metering device until the pressure in the test stand stabilizes at negative four (-4.00) inches H₂O. Maintain steady state pressure at -4.00 inches H₂O by using the control valve for at least thirty (30) seconds. Steady state flow is indicated by a pressure

change of no more than 0.05 inches H₂O on the pressure gauge. Record the final flow rate on the data sheet and close the control valve.

- 7.5** Negative Cracking Pressure. Open the control valve on the Negative Flow Metering device to establish a negative flow rate of 200 ml/min. Observe the test stand pressure. The PV Valve should “crack” at a pressure of approximately –8.00 inches H₂O. This is marked by a sudden drop in vacuum or at which vacuum stabilizes. Allow the PV Valve to continue cracking for at least thirty (30) seconds while maintaining the flow rate. Record the final pressure on the data sheet and close the control valve.

8. POST-TEST PROCEDURES

- 8.1** Remove the PV Valve from the test stand.
- 8.2** Disassemble the pressure regulator from the compressed nitrogen cylinder (if used) and place the safety cap back on the cylinder.
- 8.3** Disassemble all remaining test equipment and store in a protected location.

9. CALCULATING RESULTS

- 9.1** Commonly used flow rate conversions:

$$1 \text{ CFH} = 471.95 \text{ ml/min}$$

$$\text{Example: Convert } 0.17 \text{ CFH to ml/min } 0.17\text{CFH}(471.95) = 80\text{ml / min}$$

$$1 \text{ ml/min} = 0.00212 \text{ CFH}$$

$$\text{Example: Convert } 100 \text{ ml/min to CFH: } 100\text{ml / min}(0.00212) = 0.21\text{CFH}$$

10. REPORTING RESULTS

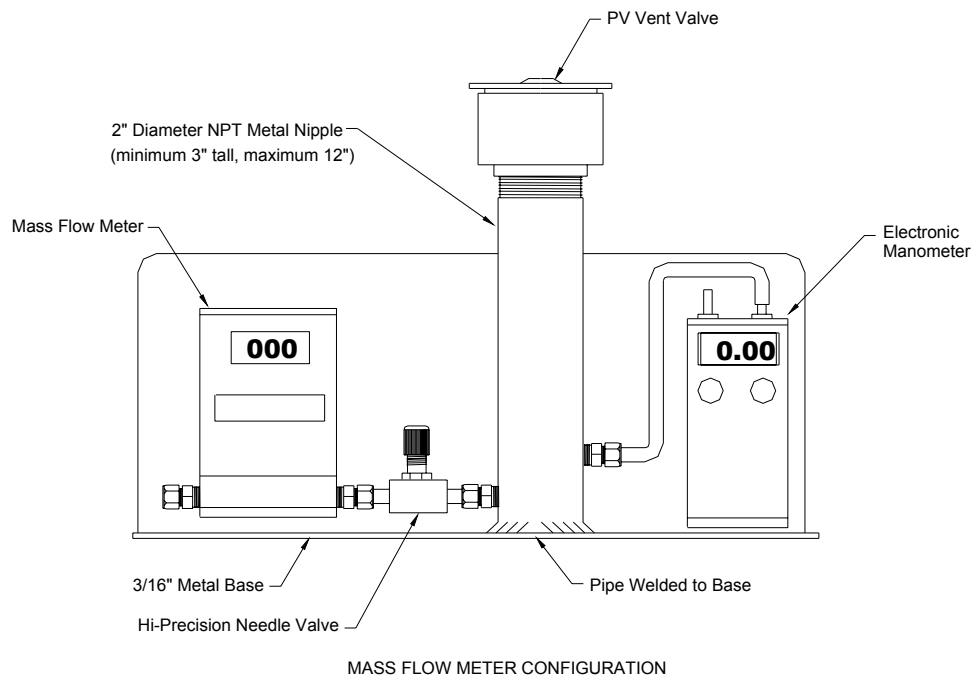
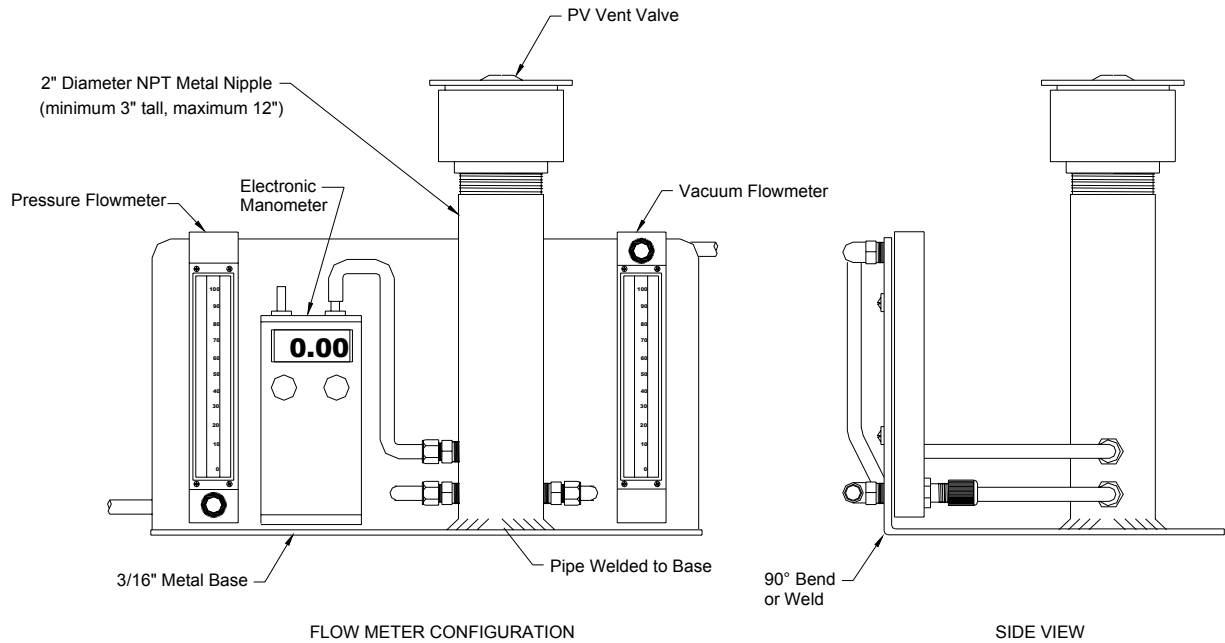
- 10.1** Record the station or location name, address and time of test on Form 1.
- 10.2** Record the PV Valve manufacturer’s name and model number on Form 1
- 10.3** Record the results of the test(s) on Form 1. Use additional copies of Form1 if needed to record additional PV Valve tests.
- 10.4** Alternate data sheets of Forms may be used provided they contain the same parameters as identified on Form 1.
- 10.5** Use the formulas and example equation provided in Section 9 to convert the flow measurements into units of cubic feet per hour (CFH).
- 10.6** For certification testing, compare results to the performance standards listed in Table 3-1 of CP-201. For compliance testing, compare the results to the manufacturer’s

specifications listed on the PV Valve for both leak rate and cracking pressure. For volumetric leak rates less than the manufacturers specified leakrate and cracking pressures within the manufacturers specified range, circle Pass on the data sheet where provided. If either the volumetric leak rate or cracking pressure exceeds the manufacturers specifications, circle Fail on the data sheet where provided.

11. ALTERNATIVE TEST PROCEDURES

This procedure shall be conducted as specified. Any modifications to this test procedure shall not be used unless prior written approval has been obtained from the ARB Executive Officer pursuant to section 14 of Certification Procedure CP-201.

Figure 1
Example of Test Stand



Form 1

Pressure-Vacuum (PV) Vent Valve Data Sheet

Facility Name:	Test Date:
Address:	Time of Test:
City :	Other:

PV Valve Manufacturer:	Model Number:	Pass	Fail
Manufacturers Specified 2.00 inch Leak Rate (CFH):	Manufacturers Specified -4.00 inch Leak Rate (CFH):		
Measured 2.00 inch Leak Rate (CFH):	Measured -4.00 inch Leak Rate (CFH):		
Positive Cracking Pressure (in. H ₂ O):	Negative Cracking Pressure (in. H ₂ O):		

PV Valve Manufacturer:	Model Number:	Pass	Fail
Manufacturers Specified 2.00 inch Leak Rate (CFH):	Manufacturers Specified -4.00 inch Leak Rate (CFH):		
Measured 2.00 inch Leak Rate (CFH):	Measured -4.00 inch Leak Rate (CFH):		
Positive Cracking Pressure (in. H ₂ O):	Negative Cracking Pressure (in. H ₂ O):		

PV Valve Manufacturer:	Model Number:	Pass	Fail
Manufacturers Specified 2.00 inch Leak Rate (CFH):	Manufacturers Specified -4.00 inch Leak Rate (CFH):		
Measured 2.00 inch Leak Rate (CFH):	Measured -4.00 inch Leak Rate (CFH):		
Positive Cracking Pressure (in. H ₂ O):	Negative Cracking Pressure (in. H ₂ O):		

PV Valve Manufacturer:	Model Number:	Pass	Fail
Manufacturers Specified 2.00 inch Leak Rate (CFH):	Manufacturers Specified -4.00 inch Leak Rate (CFH):		
Measured 2.00 inch Leak Rate (CFH):	Measured -4.00 inch Leak Rate (CFH):		
Positive Cracking Pressure (in. H ₂ O):	Negative Cracking Pressure (in. H ₂ O):		